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December 1990

PC Computing

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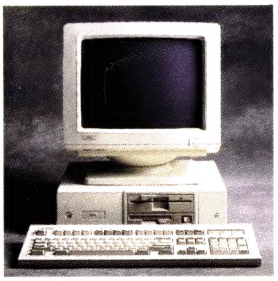

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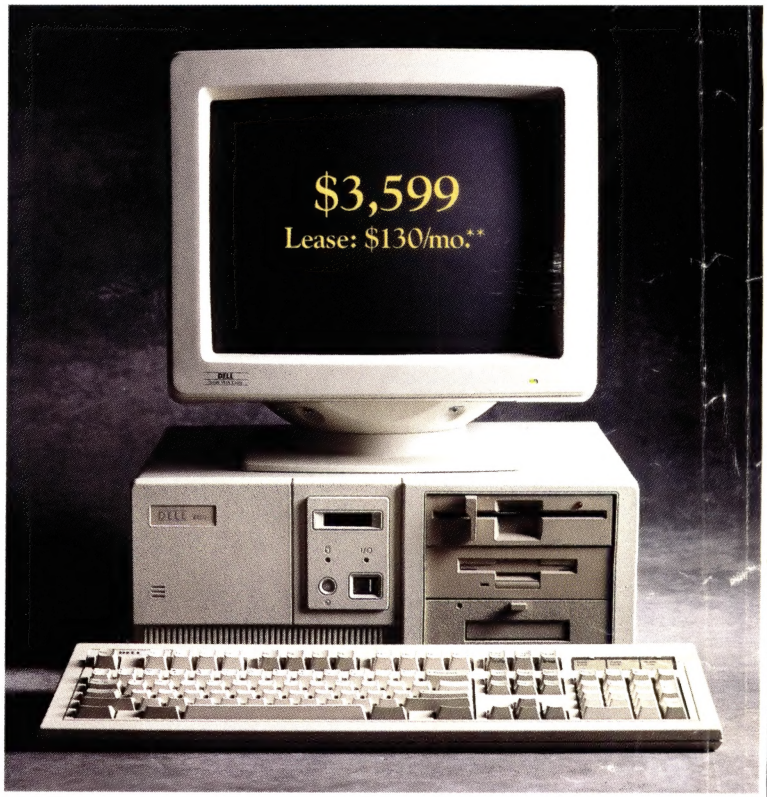

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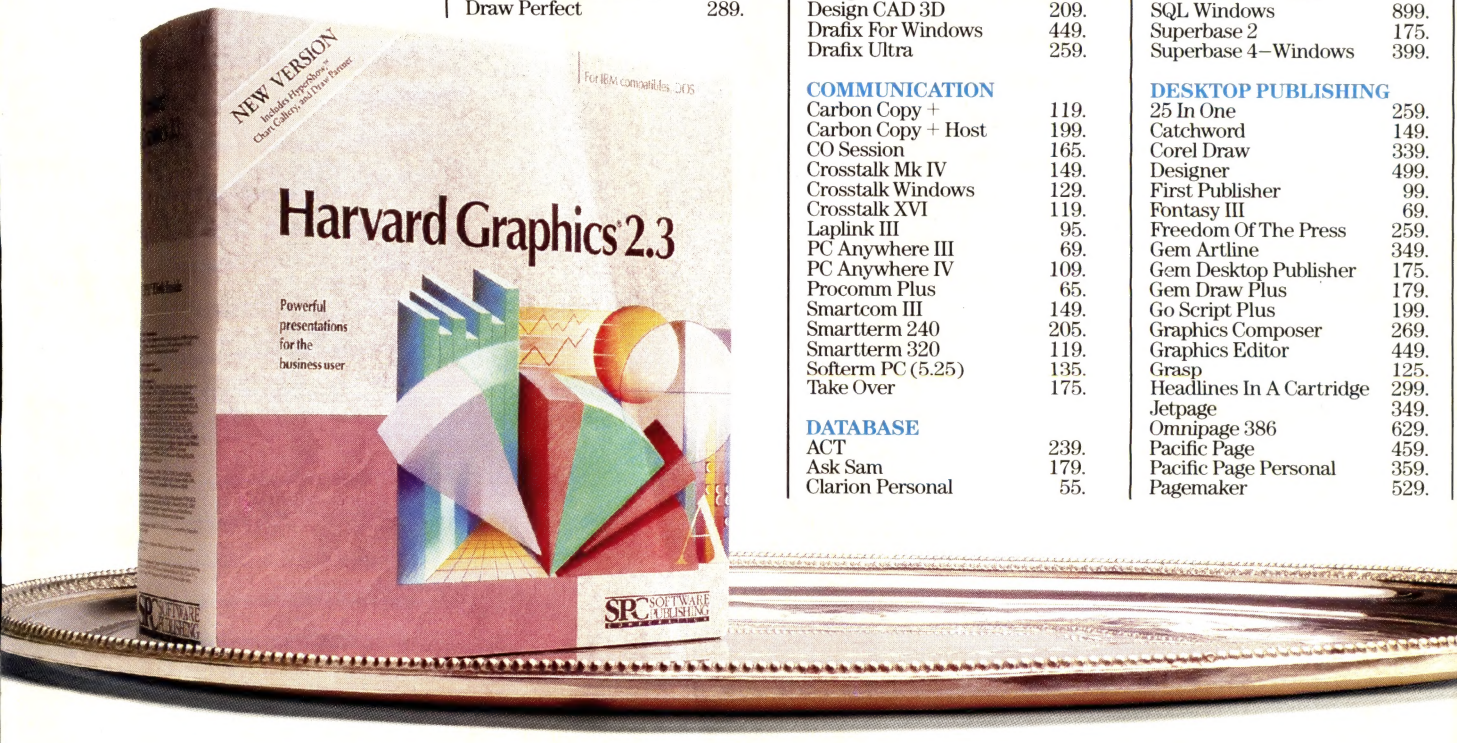

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VOLUME 3 NUMBER 12 DECEMBER 1990

PC Computing

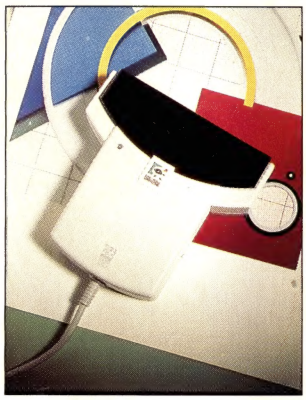
New!

45 GeoWorks Ensemble: the first multitasking GUI fast enough for an 8088

46 ScanMan Model 256 and Ansel provide *the* hand scanner for Windows users

48 SuperPrint Version 1.1 adds on-the-fly font scaling under Windows 3.0

62 GRiD 1550sx laptop is the winning Windows-to-go machine, once you adapt to the pointer and keyboard



ScanMan Model 256 takes a major step forward page 46

64 QEMM 5.1, Desqview 386's memory manager, provides more RAM for DOS applications under Windows

66 CompuAdd's 425 is a 486 for individual users only

68 Legacy word processor's many features prove difficult to grasp

78 NEC Silentwriter2 Model 90 produces jagged type, but is the lowest-priced PostScript printer around

80 VGABasic-16 board is small in size and cost but has all the features you need

82 PerformPro for Windows 3.0: a better version of an already powerful and easy-to-use forms-creation package

Help

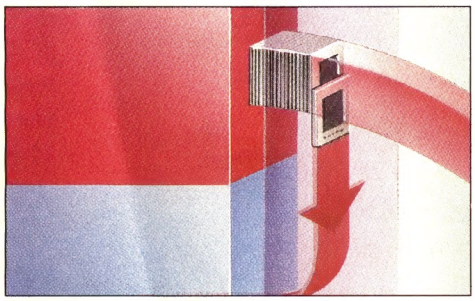
164 Project When off-the-shelf cables are too long or too short for your system, it's easy to make what you need

168 Software Secrets Make Windows 3.0 icons readable, change the .DOC default in Word for Windows, sort askSam files, control Magellan's environment and more

172 Pro Tips on spreadsheets, databases and desktop publishing

190 How It Works DOS multitasking

194 Q&A Free program finds hidden files, disk interleaves explained, tricks for adding a floppy drive and more



Multitasking shares time and power page 190

196 Hot Tips on editing your PATH, timing batch files and securing files

207 Fast Facts on using the batch commands CALL and COMMAND /C

210 Toolkit Our free program quickly strips non-ASCII files of non-printable characters

212 DOS Chris DeVoney explains how to avoid misfires when using DOS's most dangerous commands

216 Windows Craig Stinson provides alternative ways to start Windows so your applications load automatically

218 TechnoGuide RISC, CISC and MIPs defined

Consumer's Edge

264 Selling Your PC? Find out how much your PC is actually worth and how you can get the most money for it

264 Street Prices 386SX portables from ALR, Arche, AST, AT&T, Compaq, Epson, Hewlett-Packard, IBM, NEC, NCR, Olivetti

265 The PC/C Advocate tackles your back-order bothers, retrieves a refund gone awry and wrestles a response about printer repair

266 Phantom Shopper finds uneven sales support for IBM's PS/1 in two Chicago area Sears Stores

268 What to Ask when buying a hard disk card

Prime Time

272 Home Office We review 12 powerhouse fax boards less than $500 and find two that sweep the competition. Plus, tips for faxing graphics

280 Information Line DASnet lets you reach users on more than 60 e-mail carriers

280 Top Downloads Picks from BIX will keep you organized

284 Games and Leisure Ring in the season with our holiday game guide. Sound and high-resolution graphics make these games better than ever

304 Personal Finance Our mortgage refinancing templates tell you if the risk is worth it

Review Managing Your Money 7.0 boasts a faster, more streamlined interface

Cover photograph by Dana Sigall

Features

86 The Most Valuable New Products of the Year
Our annual awards honor 19 products so innovative and powerful that they push the envelope of what PCs—and their users—can achieve.

114 Add Color Impact to PC Publishing
BY SHARYN VENIT
Don't let color printing make you blue. Better publishing programs make it more practical and economical than ever to cut costs and maintain control over any print job. We look at the options you'll face when buying a color printer and explain the difference between spot and process color.

135 PC Gifts for All Seasons
BY KATHLEEN RICHARDS
We know that the true PC maven never has *every*thing, so we offer a tantalizing collection of goodies that'll make computing a holiday anytime—at the office, on the road and in the home.

145 Better Batching with Windows
BY PAUL BONNER
Microsoft didn't arm Windows with a batch file feature for the kind of quick-and-dirty programming jobs you'd like to do. Fortunately, BatchWorks and Bridge Tool Kit, two batch language tools, pick up where Windows left off.

154 Holiday Secret Weapon
BY DON STEINBERG AND JIMMY GUTERMAN
'Tis the season to get barraged at parties with PC-buying questions. Make giving advice a snap with our free, ready-to-assemble PC pocket expert!

Our annual MVP awards
page 86

A guide to PC gifts for the office, road and home *page 135*

Columns

15 Perspective
1990 was a most perplexing year

17 John C. Dvorak
Nasty secrets of software support

19 Esther Dyson
Metaphor and IBM: a partnership that makes good sense

20 Stephen Manes
The mindless escalation of business presentations

25 Richard A. Shaffer
The "home PC" is already at home

27 John Dickinson
Windows 3.0 makes system tuning merely difficult

28 Dvorak vs. Seymour
Is PC photo modification software a threat?

33 Letters
Windows barbs, Dan Quayle defenders, perilous road computing and free file transfers

320 Micro Mephisto
"Will machines that think be nasty?" asks Penn Jillette

312 Coming Soon

316 Product Index

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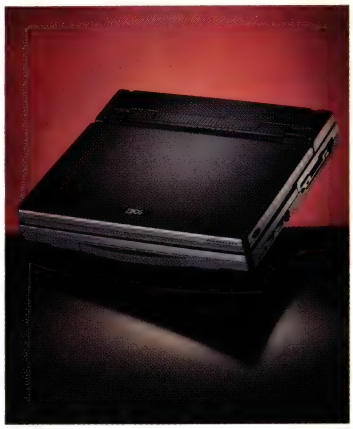

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1990: A Most Perplexing Year

PHOTOGRAPH BY RUVEN AFANADOR

BY ALL ACCOUNTS, 1990 was to have been a year in which decisions and choices that computer users faced would become easier, not harder.

This first year of the nineties, however, steadfastly defied persistent predictions that standardization and consolidation would at last descend upon the often chaotic PC market.

Once again this year, the PC business thumbed its nose at recession and grew far more quickly than even the most optimistic experts dared to predict.

So today we're left with more choices—and more difficult choices—than ever before.

We'll remember 1990 as the year in which Windows finally offered a graphical interface alternative that was worth considering.

It was a year in which the question became not when to move to OS/2, but whether to bother at all. And it was a year in which a tiny company called GeoWorks scoffed at the notion that graphical interfaces need lots of memory and a fast machine.

We'll remember 1990 for the fitful soap operas that the industry's big players acted out.

Lotus and Novell threw a huge engagement party, only to suffer a noisy breakup en route to the altar. Compaq and Businessland were reunited while the ink was still wet on the divorce papers. And onlookers clucked as the Microsoft–IBM marriage faltered over split loyalties and sagging sales of OS/2.

We'll remember 1990 for the way upstart companies challenged powerhouses in virtually every major product category. With their U.S. growth curves flattening, large PC manufacturers rallied and responded to the damage inflicted on them by battalions of laptops and direct-marketed clones.

IBM spread its elbows into home computers. Compaq launched a preemptive strike at the notebook computer market while its Systempro attacked minicomputers at the high end. From spreadsheets to databases, the number of software offerings exploded as leaders lost market share and challengers smelled blood.

We'll remember 1990 for bringing us marvelous font choices but confusing font standards; and for new EISA machines and exchangeable-CPU PCs that introduced yet another dimension of complexity to PC system choice.

But we'd just as soon forget 1990 for the way copyrights and patents were used more as weapons than as shields. And for the 386 chip shortages that held prices high and left small PC makers unable to meet demand.

In a market that resists maturity, we've got two choices as we face 1991: We can lament the tough new decisions that we must make or we can delight in the fresh diversity of an industry that seems to reinvent itself every few years.

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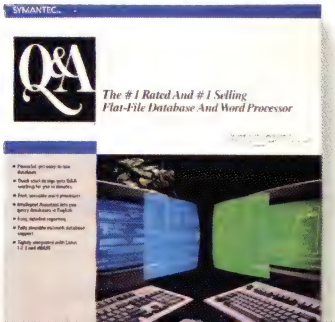

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John C. Dvorak

The Nasty Secrets of Software Support

Mad Russians, 900-number labyrinths and the arrogance of product perfection.

PHOTOGRAPH BY RUVEN AFANADOR

SUPPORT, SUPPORT, support. It's the answer to some question or other. Few companies take it seriously. I've always suspected that there was a secret society of support department heads whose meetings might go something like this:

"New business this week. We'll discuss 900-number support and how to infuriate customers more than ever. Jim Jenkins of Bear Tide Software will discuss his quest to find the worst phone-mail system. And Bad Bill Overton will share his test results using non-English-speaking Russians, who've come to America in search of software-design jobs, to man the support phone lines. Bill, please begin."

"I told 'em, all you do is read the script! You answer the phone: 'Hello? This is software support.' Then you say, 'Uh, huh, yes, yes, uh-huh. OK.' After the customer is all talked out, you say, 'OK, this problem belongs with engineering department. I'll transfer you.' Then you hang up.

"Everyone knows a Russian doesn't know how to transfer a call."

Most software developers and software marketing companies have cultivated a peculiar arrogance about their products. Dvorak's Rule 99: All software developers believe they've created perfection with each product they design.

From this perspective, of course, software vendors can develop only one attitude toward the customer: disdain.

Now don't get me wrong. Not all software companies take this view. Some of them go out of their way to make a complicated but imperfect product. Curiously, WordPerfect leads in this category.

Still, to create the proper software charisma, they simply put the word "perfect" on the package. Genius. More amazing: They can offer customer support without the arrogance.

I'm stunned by WordPerfect's support. It's great. Almost perfect. It's setting a bad example for the industry.

The idea of manning lines with Taiwanese who don't know enough English to order a Big Mac remains my favorite anti-support ploy.

Until recently. The introduction of phone-mail labyrinths has pushed bad support to new heights—or depths.

"If you are having trouble installing Master Word Menu, press 1, now. If you are having trouble installing Master Spreadsheet menu, press 2, now. Thank you. You have pressed 1. If you have the wrong-sized disks, press 1, now. If you have a blank screen, press 2 now."

I've waded into some of these menus that go five or six deep when all you want to ask is a simple question like "Do you have a newsletter?"

..."For other support questions, press 9, now!"

Imagine suicide prevention using this system: "If you're thinking of slitting your wrists, press 1, now. Thank you. Just a moment."

The most daunting part occurs when you get to the final tunnel after pushing button after button and then hear, "All operators are busy, please stand by or press 1 to leave a message."

The smart money uses labyrinths and a 900-number support line in combination. This way the hapless user pays for all the button pushing. Overnight, the labyrinths become profit centers.

The key to 900-number phone-mail labyrinth profits will be upside-down menus. Put obscure menu items at the beginning of a long list so the caller has to listen to endless (and useless) menu selections and must venture deeper into the system by selecting "9—OTHER" over and over. A long, boring introduction will also rack up the charges. It might go something like this:

"Hello. Welcome to Dog Breath Software's computerized 900 super support system. It's designed to keep you, our customer, happy and apprised of our latest updates. All this is done quickly and efficiently. Using an advanced voice-mail switching system, we can quickly and efficiently put you in touch with software specialists who can answer your specific questions in seconds. We have some of the best experts in the industry working at Dog Breath Software and they want to help you, our customer. You will be asked some questions by the voice-mail system. Press the appropriate button on your Touch-Tone phone to move to the next item."

Then the list begins: "If you want our brochure, press 1. If you want to order additional documentation, press 2. If you want our fax number, press 3. If you want to apply for employment, press 4. If you want to take part in a straw poll, press 5. If you have suggestions for improving our product, press 6. If you want to order a special pen and tie-tack gift set, press 7. If you want to be added to the mailing list, press 8. If you have a question, press 9."

Isn't progress wonderful?

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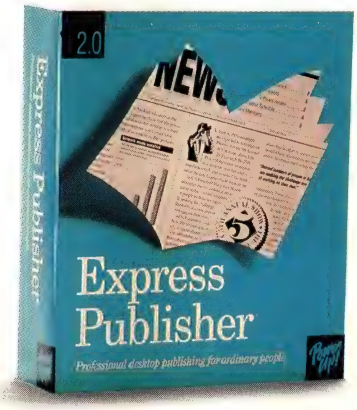

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M126

Esther Dyson

What's Up with IBM And Metaphor?

Their new venture will enable developers to build applications for any operating system.

PHOTOGRAPH BY RUVEN AFANADOR

"MARLA MAPLES?" says Donald Trump. "She's just a good friend."

"Metaphor?" says IBM. "They're just our good friends."

I suspect there's more to IBM's recent deal with Metaphor Computer Systems to form Patriot Partners than meets the eye. Yes, it may signal some IBM dissatisfaction with Microsoft, as everyone says, but this partnership also makes good technological sense.

It addresses a pernicious problem that nags both application developers and users: how to live with today's bewildering choice of operating environments—DOS, Windows, OS/2-PM, Unix with Open Look or Motif or whatever. Developers can't decide what to build for and users can't decide what to buy. Everything should be portable, but nothing really is.

All these formats and interfaces are precisely the kind of rich, structured, complex data that are best represented as objects. That's where the IBM–Metaphor deal comes in. I can't predict the outcome of the IBM–Microsoft marriage, but I can understand the appeal of the new Patriot offering, which will allow developers to build object-oriented applications without worrying about operating systems. This, in turn, should allow customers to unlink their application and operating system decisions—a truly liberating prospect.

Why might the IBM–Metaphor team gain from object-oriented programming a benefit that has so far eluded others? Because Metaphor has all the right pieces in place to make this new programming model fly. The often-touted advantage of object orientation is reusability, but this promise must be tempered from two sides: All code is theoretically reusable, but it must be both worth reusing and modular enough so that you can reuse or extend discrete parts of it in new combinations. Object orientation makes these benefits easier to attain, but it doesn't guarantee them.

First, the objects must be carefully constructed, with clean, intelligible interfaces for interacting with other objects and for modification or specialization by reusers. Second, the objects should be well-conceived ones that developers and users understand and want to deal with.

A variety of companies have built their own object-oriented applications, but these pioneers tend not to encourage third-party participation. On the other hand, a number of vendors have built rich foundations for such systems, but without much embedded application knowledge.

Hewlett-Packard's NewWave, for example, is a full-fledged object-oriented environment for developers and users, complete with interface. Unfortunately, most of the objects it manages are merely DOS files linked to the applications that created them. In a sense, HP put the cart before the horse: It has the framework, but little to put inside it.

A few applications have been converted to be NewWave-aware (1-2-3 and Excel, for example), enabling them to work as NewWave objects such as a spreadsheet or a chart. But there are few standard NewWave objects available at the level where an application might manipulate objects instead of being a set of methods attached to a formatted file. (That is, a WK1 file plus 1-2-3 is an object, but 1-2-3 itself knows little about objects; its cells are not objects, but internal data structures.) In short, NewWave is an object-oriented environment, but it has very few classes of objects and no built-in support for a particular object-oriented language.

Unlike NewWave, Metaphor has started with an application—its own Data Interpretation System—or at least a set of specific capabilities, rather than an abstract notion of an object-oriented environment.

Likewise, Patriot will offer an object-oriented environment already populated with a fair amount of applications capability encapsulated as objects. It will be C++-based and 32-bit-specific, but it will run with OS/2 or Unix. Other versions should be easy to develop for any platform that supports a C++ compiler.

The IBM–Metaphor system should offer a rich array of objects for applications to manipulate, starting with text and data objects, voice and image.

Asked how the system differs from NextStep, the programming environment of NeXT computers (apart from its basis in common PC standards), Metaphor Chairman David Liddle replies, "Not much. But we're four to five years further along from where we started."

What can users do now to prepare for portable, object-oriented software until the Patriot toolkit appears next year? Develop for OS/2 or Unix and use C++, Liddle says. That's the way IBM and Metaphor will go, and whoever wants to ride with them should take heed. ◪

Psst, Want to See Some Hot Slides?

Mindless escalation of business presentations continues its dizzying, dumbfounding climb.

IN THIS MONTH'S column, Mr. Manes will cover what he wittily calls "the mindless escalation of business presentations." But first, as his exclusive sales representative, I'd like to take just a bit of your time to show you why you should read his column. I've brought along this computer, so kindly direct your attention to the screen:

• **EXPERIENCE.** Mr. Manes has been a mainstay of the computer business for more than 52 years. As this bar chart shows, that's more than his five nearest competitors combined.

• **EXPERTISE.** Mr. Manes meets regularly with industry leaders and public relations officers. This line graph demonstrates the amazing annual increase in his personal collection of business cards and unopened software.

• **AWARD-WINNING JOURNALISM.** The most telling tributes are those that come from your peers. Fellow journalists have awarded Stephen Manes this beautiful statuette, their highest accolade: the "Felix" award, a handsome screwdriver that will access the telephone lines of any known pressroom.

• **THE BEST OF BOTH WORLDS.** As this charming animation indicates, Mr. Manes brings both *humor* and *insight* to every column he writes. The flashing point in the upper-right-hand corner of this chart shows conclusively that the Manes column significantly outpaces the competition in both wisdom and wit. And here you can easily see that no one else comes close to Manes for both power and ease of use.

But don't take my word for it. Let's see what typical readers say. I think you'll really enjoy this state-of-the-art DVI-based video:

"You know, it's not just what Manes says. It's the way he says it. That's why our user group thinks Manes is tops.

"He's the most insightful columnist around. He calls it the way he sees it. That's why I'm a Steve Manes fan. So are the all other CEOs I know. Why, you could say we *rely* on Manes.

"Manes? His columns fairly sing. So from Luciano and all the opera's computer personnel, here's a musical salute: Bravo, Steve Manes!"

Nice, huh? But let's let the master himself do the talking. Here are some excerpts from this month's piece:

Style over substance. Form over content. Beauty over brains. Video glitz over musical talent. It's the age of production values, and nowhere more so than in American business. Forget better goods and services; Persuasion (and not just from Aldus) is what counts. Companies don't make products; they make presentations. And not just to convince customers. You now need presentations to persuade colleagues. No employee can simply tell the boss, "Let's buy those 700 gizmetti from Italgizmo. They've got the best deal." The subordinate needs a presentation to prove it. If the boss said, "Great! Go ahead," the underling would complain, "Wait! You haven't seen my presentation!"

Presentations once were interminable bores with ugly overhead projections or ugly black-and-white slides or flip charts. Computer-generated color overheads, drop-shadowed slides and slick animations have changed all that: They've made presentations interminable bores with pastel colors.

Computer technology keeps escalating the minimum acceptable presentation. Where once 10-point Courier and a few hand-inked graphs did the trick, now no one will accept anything less than a fontorama wrapped around high-res graphics. Multimedia maniacs bank on the probability that within a year or two, full-motion video will be mandatory for every crummy sales pitch.

All this internal and external persuasion wastes plenty of time and labor—costs that are passed along to customers. Besides, anybody foolish enough to base a buying decision on a presentation ought to be graph-whipped.

Somewhere, though, you'll find a business perfectly happy with hand-scrawled documents that summarize decisions in a couple of pithy lines. Unfortunately, that somewhere is probably in the Orient.

Which reminds me: As this spinning globe animated with citizens in colorful costumes proclaiming "We love Stephen" in their native languages so vividly shows, Stephen Manes has earned worldwide acclaim. The proof of the pudding is in the pie, and *this* pie chart clearly proves that Manes dominates the field. So we hope you'll read his column every month. And you might want to send a letter to the editor, congratu...

Excuse me. My cellular phone. Hello? Boss? You're sore because I left out that joke about Presentation Manager? And that stuff about presentation software? Well, there just wasn't room. I mean, who reads every word anyhow? Hey, calm down. Don't worry. My presentation was absolutely brilliant! ◪

In a world that changes economic systems overnight, can we really afford personal computer systems that take weeks to set up, months to learn, and years to deliver on their promises?

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The new Macintosh Classic, Macintosh IIsi, an

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** The figures are included in a 1990 study conducted by Diagnostic Research, Inc., among Fortune 1000 managers and business computer users familiar with Macintosh and MS-DOS or Windows systems. Call and we'll send you*

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Running a 20 MHz 68030 microprocessor, the new Macintosh IIsi delivers serious number-crunching at the most attractive possible price.

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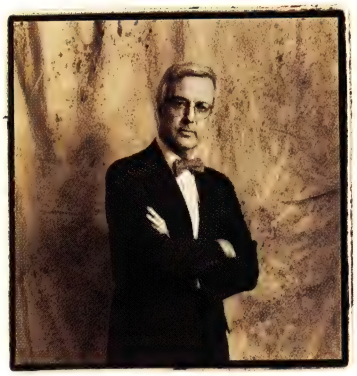
Richard A. Shaffer

Invisibly, the PC Is Already at Home

The computer industry's manufacturers are simply trying to sell the wrong product.



PHOTOGRAPH BY REX RYSTEDT

IF THE COMPUTER industry really wants to capture the home market, it will have to resort to disguise.

The direct pitch—IBM's PS/1 and Tandy's 1000 RL represent the latest invasionary force—just won't work. As a market, you see, the home bears a striking parallel to China: vast, potentially rewarding and easily misunderstood. You'd think that the computer industry would have learned the lesson that 19th-century U.S. cloth merchants finally had to accept as they gazed longingly at the Far East. They dreamt of huge profits if only they could add a few inches to the tail of every shirt worn in China. But Chinese fashion followed its own course.

A century later, computer makers dream of the hundreds of millions of U.S. households and imagine how revenues would soar if every one of them could be induced to buy a computer.

Manufacturers are trying to sell the wrong product.

Sure, some people want computers at home. For them, the home is an extension of the office and a place where they can finish some extra work.

But for most of us, office work has no place in the home, so there's little need for office equipment there.

Most people believe the old ways are still the best for balancing a checkbook or paying bills. In education and in entertainment, too, the computer in the home still plays a deservedly minor role.

Fortunately, most of the computer industry has sensibly moved beyond efforts to persuade us that its products are great places to keep favorite recipes or Christmas card lists. Unfortunately, it hasn't moved very far beyond that, and persists in trying to adapt a business machine to the home. Not surprisingly, the shirttail remains at its usual length. Face it: Most people harbor a suspicion of change unless it seems manageable and they can be persuaded of its overwhelming benefit.

Ah, but suppose change is so disguised that it's imperceptible?

A surprising number of adults, for example, can't figure out how to operate their VCRs. The computer makers' solution? Create software and an interface enabling a home computer to control the VCR. Right?

Wrong. The smart approach doesn't involve a computer, as such. Software (including context-sensitive instructions) and interface should be built into the VCR so that the machine could be controlled merely by touching icons on the TV screen, like the experience of interacting with a Mac through the words and pictures of a HyperCard script.

The most important computers are not those that are appearing in our homes but the ones that are disappearing. In fact, if you count microprocessors and microcontrollers as computers (which, of course, they are), most homes today have more computers in them than electric motors.

Think for a minute. These little computers reside in thermostats, microwaves, phone-answering machines, digital clocks, self-focusing cameras, CD players and so on. They reside in the video game machine, the electronic keyboard and that portable typewriter at the back of the closet.

But who thinks of these gizmos as computers? We think of them in terms of what they do, not in terms of the technology on which they rely. It's a distinction to which computer manufacturers have apparently not awakened.

In the home, digital technology sells best in disguise; the route to the mass market is not to make the computer easier to use but to hide it in products that people already know how to use.

More technology is headed for the home. Television, for example, is going digital as microprocessors and memory circuits come into use to improve and manipulate video images. Digital audiotape is just emerging, and soon there will be digital videotape (naturally, since almost every household has an analog video recorder). Broadcast radio will go digital. So will portable telephones.

But will we think of computing when we buy a digital radio, telephone or recorder? Nope. Properly done, the technology will be invisible.

Sure, I see a consumer role for computers, but only when the keyboard interface is set aside. Most people, you may be surprised to know, don't type. But they can write and they do use pencils and pens to make notes and lists, pay bills, write letters and keep calendars.

It takes little imagination to see, therefore, that the so-called pen-based computer will be a vital first step toward a consumer product that eventually will become as common as a notebook.

The true home computer is still several years away. But when the market for it finally arrives, it sure won't look much like a home computer. Bet your shirttail on it.

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John Dickinson

Power Users, Wrest Windows Control

Microsoft won't help, but you can learn the secrets of .INI. There must be a better way.

PHOTOGRAPH BY FRED STIMSON

POWER USERS WANT it their way. They want to muck around and make their PCs work just so, make them dance to the beat of their drum. In DOS, that's easy. In most other operating environments, it isn't. Tuning your system was impossible with early versions of Windows.

Windows 3.0 makes it merely difficult.

Take, for example, the control system that Windows uses. It's obvious to anyone who's ever written a computer program that you need parameters to control the way it works. Whatever program you write must understand and respond to everything from screen colors to the kind of printer hooked to the parallel (or was that serial?) port. This isn't news to you, even if you've only *used* a program.

Any right-minded person would think that the finest software engineering minds in the Pacific Northwest would've come up with a sophisticated way to do this. They have, sort of. The Windows 3.0 Setup and Control Panel programs give you many of the tools you need to get your system hooked up the right way, and keep Windows apprised when you change your equipment or your mind. Windows 3.0 is much easier to tune than its predecessors, which required you to reinstall the entire program if you changed your mouse or video card.

But Setup and Control Panel don't (or can't) always do the job the way you want, so you might look into how the control situation actually works in Windows 3.0. You'll never guess: Windows uses control cards.

Yup, control cards, just like the ones we used in the good ol' days when 5081 cards were punched on an 023 card punch and sorted on an 083 sorter. Control cards. That's mainframe stuff! *Old* mainframes. The language Windows 3.0 uses is a little easier to understand than the Job Control Language that still plagues IBM mainframe users, but not much. Oh, joy!

Of course, none of this is documented but, if you're clever, you can get into WIN.INI, SYSTEM.INI and a few other .INI files and change the control cards to modify your environment. Any text editor, such as Windows' Notepad, will do. Microsoft supplies an undocumented program called SYSEDIT.EXE (it's installed in your WINDOWS\SYSTEM directory) that lets you edit WIN.INI and SYSTEM.INI, along with your AUTOEXEC.BAT and CONFIG.SYS files in a four-file Notepad environment. Modifying the files directly can be much faster in some cases than running Setup or Control Program.

Besides, editing them gives you the chance to figure out what's going on and tinker with it. You'll learn, for example, that many Windows programs dump their control cards into WIN.INI when you install them. You didn't give them permission. They just did it. If you change the program's directory without modifying WIN.INI, it won't operate correctly. If you decide to give up on the program, you can delete all the files, but no one supplies an UNSETUP program that will clear out the unnecessary control cards for you.

That's the good news. The bad news? You have to do all this with almost no guidance from Microsoft. The Windows documentation vaguely refers to the need for coordination among WIN.INI, SYSTEM.INI, CONFIG.SYS and AUTOEXEC.BAT, but what that may mean is up to you to discover—using undocumented files and tools. Discover, in this case, means trying configuration combinations until your system crashes, then trying to detect which part of your experiment went wrong.

You probably created AUTOEXEC and have a good understanding of what's going on there. However, a lot of programs, including Windows applications, modify this critical file when they install themselves, and even more of them modify CONFIG.SYS. Removing device drivers—one at a time—from CONFIG.SYS may be the only solution if your system and Windows 3.0 don't get along. There are a few changes you can make without thinking very hard: remove unnecessary mouse drivers and disk-caching programs from either file. Windows supplies its own and installs them at the outset, but has no way of knowing whether you have other similar programs installed. You have to remove them, and their conflicts, yourself.

Microsoft would like to get rid of CONFIG.SYS and eliminate much of the need for AUTOEXEC.BAT. They'd do well to get rid of WIN.INI and friends as well. But don't expect that any time soon, not even in the next release of DOS or Windows. There's too much installed hardware and software and too many users who depend on them.

Meanwhile, get in control of those cards! Microsoft, are you *sure* there isn't some better way?

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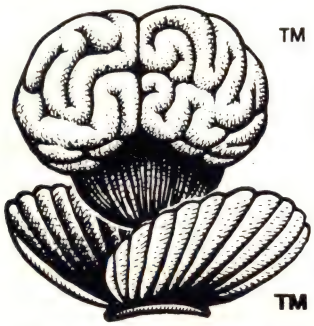

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Every Picture Really

A recent story in The New York Times *focused on the growing potential for deception in published photographs due to increased use of PC-based photo-modification programs. The story has been seized upon by journalism critics, who see these tools contributing to a decline of public confidence in published material.*

SEYMOUR: John, this is just more spouting off by some well-meaning people who simply don't understand computers—the same people who blithely blame "the computer" when they make a mistake balancing their checkbook.

Electronic retouching of photos is nothing new. Andy Grundberg's story in the *Times* made that clear: *National Geographic*'s public mea culpa for moving the image of two Egyptian pyramids for a cover shot almost a decade ago got a lot of publicity, and *Rolling Stone*'s more recent electronic retouching of a Don Johnson picture to remove a shoulder holster and pistol got a lot more.

Heck, people have been manipulating press photos for more than a century.

DVORAK: Well, I'm not one to stop progress. Computers do make retouching a lot easier, you have to admit. In most situations, the computer provides a way to save money. If the composition of an expensive photo isn't just right, it can be easily altered without having to go back and reshoot everything. As for the decline in confidence feared by journalists, I think it's an epidemic. I'm amused that all this chit-chat about fraud and decline in confidence was raised in *The New York Times*. That's the paper that published rosy stories from Moscow during the Stalin regime as Stalin killed 20 million people and established a slave-labor system. More recently, the *Times* was the apologist for the Pol Pot regime of butchery. I suppose it's good to distract the public from the observation that plain, old-fashioned lies in print are somehow not as sinister as a retouched photo.

On the other hand, even with distorted writing, the truth eventually emerges. The issue with digital photography is: How can the truth be preserved as an image when the original (in the sense of a negative) doesn't exist?

SEYMOUR: Sure, someone took one or more standard photos, scanned them, assembled them into a "reality" that never existed, saved the file...then that digital image was erased after the publication appeared. What a transient definition of "reality!"

The silliest part of this notion that PCs are leading us down the path to journalistic hara-kiri is the idea that photographs have any great innate veracity. From Roger Fenton and Mathew Brady to today, photographers have always used a selective eye to deliver their interpretation of the truth. Even Eugene Smith, the wrathful giant of photojournalistic integrity at *Life* magazine in the fifties, turned in prints that were highly manipulated—even photomontages—and that *Life*'s editors published as simple truth.

Does Tell a Story

Jim and John take their usual sides in weighing the perceived threat of photo modification software.

DVORAK: So I take it that your wife received a photo of you with another woman and you're on this path to prove that the photo was faked. At the time of the photo you were actually giving a speech someplace else. Yes? No? As with the written word, it's an issue of trust. In the end, the viewer must determine the veracity of the photo based on criteria other than what he or she sees.

Your point that photos have been faked before computers is moot. When something changes from a rarity to a commonplace, the public should be warned. The *Times* is actually doing people a favor by making them aware that any moron with a PC can fake a photo and that the public should be more cautious. What's wrong with that? I doubt that more than a few people have any idea that this is possible. They need to wake up and learn something.

SEYMOUR: The problem with this kind of hue and cry is that it leads people to blame computers for whatever they think ails society. Sure, we should tell people how easy it is to fake photos, that the results are so good that experts can't always spot them. And that today the preferred tool for faking photos is the computer.

But let's put it in perspective: The problem is in the medium of photography, not in computers. And as you said a minute ago, why do we assume photos are the sweet, pure truth but the written word is suspect? Neither is inherently more trustworthy than the other.

As you say, even with the distortions in both forms, the truth will emerge. Usually. I hope.

Geez, John, I'm getting even more cynical than you are.

DVORAK: Cynical? Moi? Perhaps, but in all this debate, you're overlooking the real threat. What happens when people get too excited about new technologies and their impact on issues such as photographic truth? The government is asked to form a committee to study the "problem" and recommend legislation. The next thing you know, some off-base law requires that photographers be licensed or who knows what.

The only answer, as I said before, to lies and distortions is a well-educated, computer-literate populace. I see no evidence whatsoever that we're headed in that direction.

SEYMOUR: Wait a minute. I'm the guy who always complains about government sticking its nose in! John, I'm proud of you. You're coming around.

The point here is not to accept new tools but to shed our naïveté about singular truths.

I'm a big fan of Adobe's PhotoShop photo-modification software, for example. My experience with PhotoShop has made me wary—not cynical, just wary—of the literal truth of other photographs I see in print. That's a healthy change.

That combination of being open to new tools but also alert to ways we should change our expectations is a good prescription for dealing with the idea of "truth" in the computer age.

PHOTOGRAPHS BY RUVEN AFANADOR

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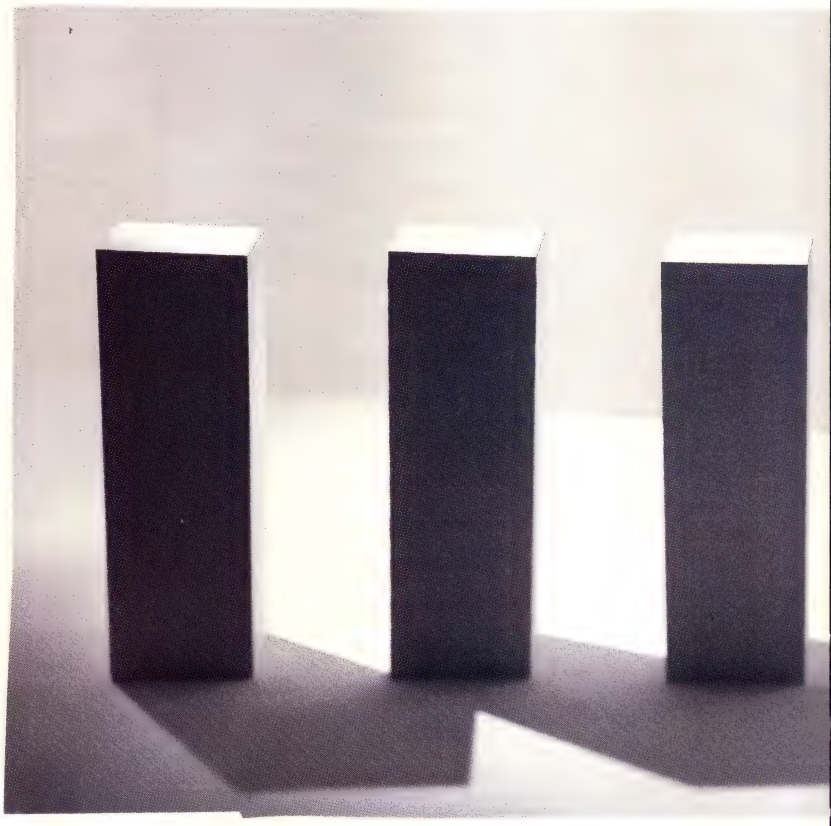

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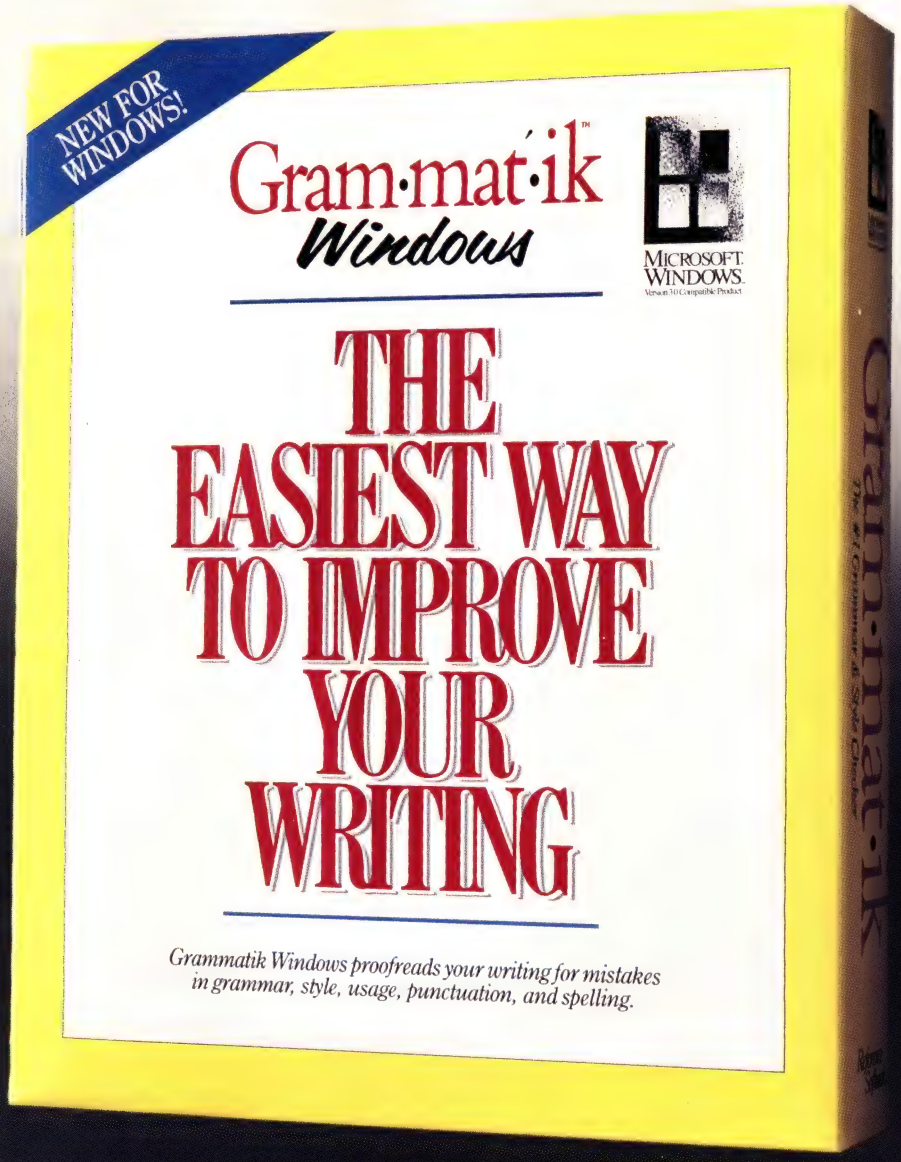

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CIRCLE NO. 241 ON READER SERVICE CARD

Windows Barbs Spark Heated Dialogue

Dan Quayle's defenders, LAN commandos' notes and free file transfers.

Heated Words on Windows

I was amused by a couple of columns in your September issue. First, John C. Dvorak puts the Windows 3.0 explosion down to "marketing hype" (page 15). Stuck for a column, John?

How many big, impressive, colorful software packages from major code houses *haven't* been hyped? Besides, if the "fad-crazed public is looking to hop aboard a bandwagon," they'll find the wagon already filled with industry pundits who doubtless "yearn to be a part of something bigger than themselves, anything at all." Be fair, John; let he who is without hype poison the first quill.

Then comes Stephen Manes (page 19), who gets no points from me for making fun of the vice president. Too easy a target. As for pointing out that using Windows 3.0 isn't as easy as the Mac, anyone who's ever played Lock-up Roulette with MultiFinder can't help but be astounded by Win 3's robustness.

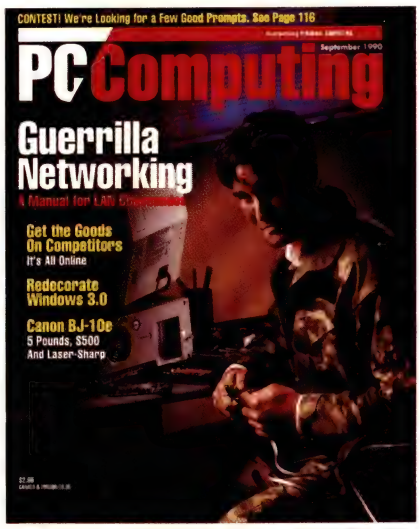
The magnificent thing about Windows is that it *does indeed* "work with anything-goes hardware and software." As for those expensive hardware upgrades, I don't think too many 512K Macs will be running System 7 (if the operating system ever gets out of beta). And if you have no "real need for unique-to-Windows applications"—huzzah!—you don't have to buy Windows. How many Mac users can vote with their dollars on that question?

DAVID L. STAPLES
WICHITA, KANSAS

Dvorak's right. GUIs are memory and machine-cycle hogs. What good is it to have a 386 machine with a couple of megabytes of memory when software doesn't use it properly? Six years ago, programmers turned out amazing products for 4.77MHz, 64K PCs. Now, with exponentially more powerful machines, they give us high-overhead software that's slow and doesn't even take advantage of the memory management available! What's happened?

HARVEY WARNE
VIRGINIA BEACH, VIRGINIA

As usual, John C. Dvorak hit the nail on the head: Windows 3.0 is a fad. But it is not the first big "pet rock" of computer



faddism. That honor goes to networking, which, ironically, was the cover story in your September issue.

D.C. STULTZ
MELBOURNE, FLORIDA

I'm sorry to read that Windows is too complicated for Stephen Manes. I found it quite easy to use; just install and run it. I've also browsed and modified the WIN.INI file without problems. Perhaps it's hard for some people to accept new things when their minds are stuck in old ways.

DOUG REECE
BOISE, IDAHO

I, too, was lured into buying Windows 3.0, thinking that it would make my PC (a 386SX with VGA and 5 MB of RAM) easier for my family to use. Ha!

After switching my internal modem to COM2 (it wouldn't work on COM4) and spending endless hours tweaking *.INI, I still couldn't get DOS applications to run windowed or in the background. After a 30-minute, long-distance call to Microsoft, the technician ended our conversation with, "If you get it to work, let us know."

At long last, I've discovered that Windows and my video board don't communicate properly. It's forcing me to upgrade my BIOS, while my dealer applies a patch to my video board.

This is progress?

MIKE DOWLING
LEWISBERRY, PENNSYLVANIA

To run DOS applications under Windows, see "Add Windows Flair to DOS Favorites" (November, page 149).

Quayle, Windows Defended

Stephen Manes's reference to Dan Quayle has destroyed his legitimacy as a writer.

A published article in a national magazine that makes a personal attack on any individual the way he portrayed Quayle is in extremely poor taste.

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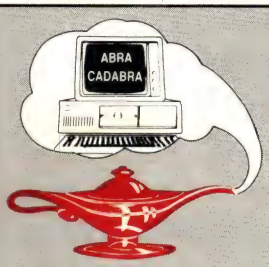

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Perhaps for balance, Manes could write about dBASE IV, showing how to construct a record using the moral qualities of Ted Kennedy as data fields.

RICHARD MCDERMOTT
BAYSIDE, NEW YORK

Manes's column included some of the worst cheap shots I've seen.

ARVID E. JENSEN
PARLIER, CALIFORNIA

Bartlett's Familiar Quotations *(14th edition) quotes Finley Peter Dunne's "Mr. Dooley": "Th' prisidincy is th' highest office in th' gift iv th' people. Th' vice prisidincy is th' next highest an' th' lowest. It isn't a crime exactly. Ye can't be sint to jail f'r it, but it's a kind iv a disgrace. It's like writin' anonymous letters."*

If this unscientific sample of readers is any indication, Windows 3.0 is in trouble. When your product has fewer loyal defenders than Dan Quayle, you're in deep doo-doo! —*Stephen Manes*

Notes from LAN Commandos

It's annoying when articles contain errors that indicate an author's unfamiliarity with his or her topic. "NetWare Survival Kit" (September, page 86) suggests that you must either log off or reissue the CAPTURE command to end the effect of CAPTURE. I've used the ENDCAP command with NetWare 286 and I've experienced no trouble.

BOB M. DRAKE
CINCINNATI

ENDCAP redirects printing to local mode. That's great if you've got a printer hanging from your PC, as you apparently do. But for the many users who don't, ENDCAP sets them up for frustration and possible loss of data. If you rely on network printers, at best you'll get a confusing "Printer Not Ready" message the next time you try to print because the PC is looking for a printer that doesn't exist. At worst, you'll hang your work session and have to reboot if you're running an application that can't handle the error.

—*Carol Ellison*

The sidebar to your Guerrilla Networking story ("Netware's Entry-Level System," September, page 79) may have in-

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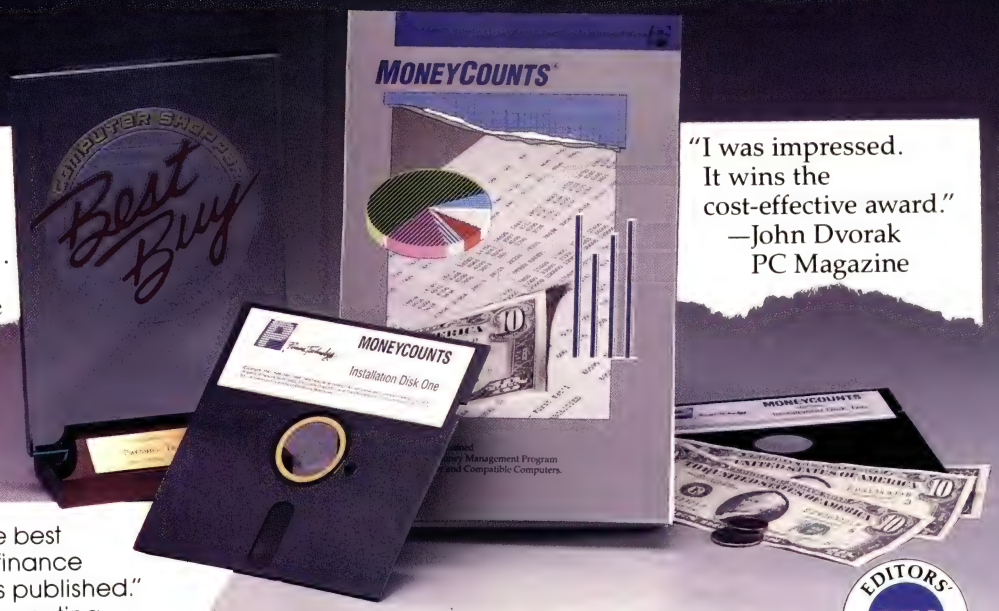

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advertently rained on the parade of users ready to jump on the LANtastic bandwagon. You state: "Peer-to-peer LANs can become administrative nightmares as business grows. All computers must be kept on to ensure that applications and resources are available. And because many low-end LANs work with proprietary network interface cards, they cannot be upgraded to a Novell system without a significant investment in new cards."

In a peer-to-peer network, only the computers that share resources must be powered up at all times. How is this requirement any different from NetWare? If you had multiple servers, you would need to keep them powered up to allow log-ons and device sharing. The same is true with multiple servers in a peer-to-peer network. Workstations can be turned off at any time in either scenario.

REESE KAPLAN
NEW YORK CITY

No rain was forecast. LANtastic and some other low-end LANs do use industry-standard interface cards. That's to their credit, and we never implied that they didn't use them. Many others don't, however, and that can cause extra expense for offices that expect to grow into NetWare.

Regarding your second point, we seem to disagree only over semantics. You can describe a network that concentrates shared resources on a lone PC as "peer-to-peer." But a lot of definitions would call it "client-server."

—Craig Ellison

Forget Buying Retail

The Phantom Shopper's experience with CompuAdd (Consumer's Edge, August, page 191) was hardly isolated. I haven't seen an impressive computer retail store since the days of the Byte Shops. Most stores are filled with technically incompetent salespeople who give no more than lip service to customers' needs.

I prefer mail-order shopping because the customer support is generally better. Until retailers learn to solve problems creatively, rather than just sell systems, users can only dream about timely, honest and individualized service.

"Phantom Shopper" is an excellent idea. Keep up the good work.

BRIAN E. SMITH
PIEDMONT, SOUTH CAROLINA

See how three leading mail-order houses stacked up in our September issue (page 276). Also, check out in this issue how IBM's PS/1 is faring in two Chicago-area Sears stores (page 266). You never know where the Phantom will strike next. *—Phantom Shopper*

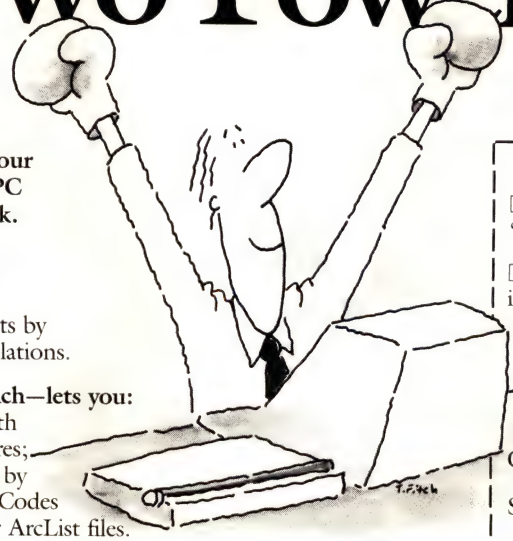
Perilous Road Computing

"Laptop Emergency Toolkit" (August, page 112) is some of the most irresponsible journalism I've ever read. I install phone systems in hotels and motels. If readers follow your advice on how to connect when there is no wall jack, they could easily bring down the entire phone system in the hotel or motel.

I'm also appalled that you recommend

Mail smarter and save money on your PC using the

One-Two Power Punch



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The pre-printed form remains the backbone of information flow. Corporations employ hundreds of thousands of pre-printed forms to gather and distribute information internally and externally. Many of these pre-printed forms contain multiple pages, multiple parts, interleaved carbons and other devices that must be addressed when data entry is performed. More importantly, some forms include legal language, disclaimers and other important notices on the reverse side of each sheet, and may require signatures, making them, in effect, contracts.

As corporations seek a balance between paper and electronic forms, they're placing a high priority on making paper forms more efficient, reducing fill-in time, and establishing connections with their database.

While most forms are still completed by hand or using a typewriter, FormFiller allows this task to be automated using virtually any PC and printer configuration, without special hardware, graphics or dedicated printer stations. Waste, inefficiency and error, inherent in the manual fill-in of pre-printed forms, can grind the flow of information to a standstill, and cost thousands of dollars in lost time and unproductive work.

FormFiller is the ideal fill-in solution for government, insurance, legal and tax forms, building permits, medical forms, shipping airbills and countless others.

FormFiller is the only system specifically designed to accurately fill-in pre-printed forms with pinpoint-precise accuracy — for up to 640 fields! It eliminates the tedious nature of form fill-in, and allows forms, regardless of their type or complexity, to be filled in with unparalleled speed, and without the margin for human error.

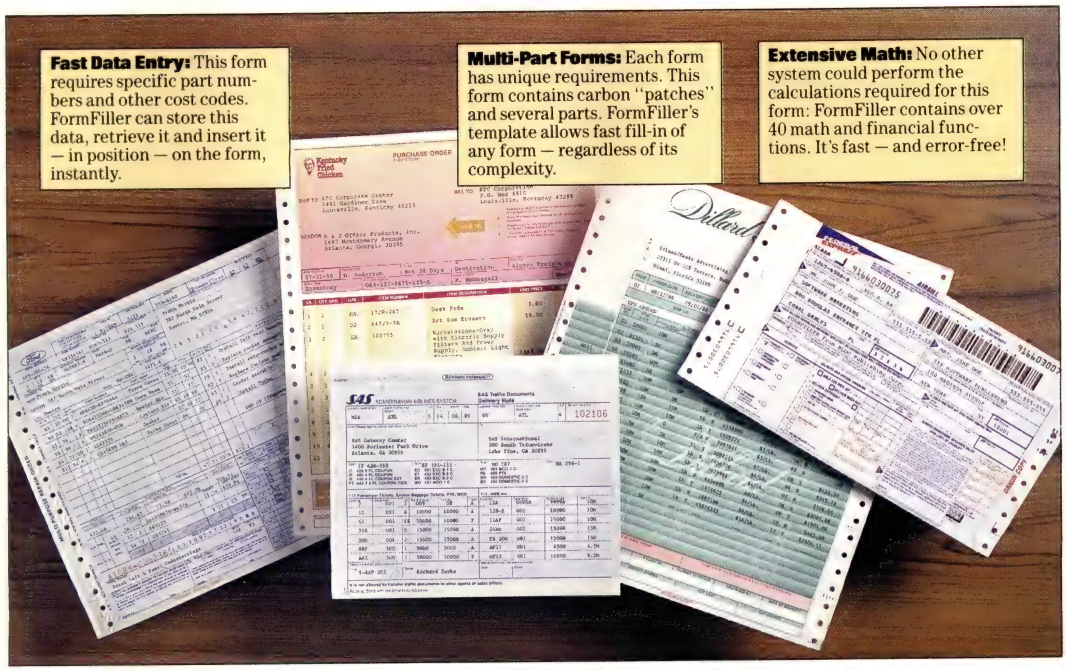
FormFiller's advanced mathematical and financial calculation capabilities allow you to enter values and have the system make the calculations (using dozens of built-in formula functions) automatically. These extensive math functions include percentages, exponents, depreciation, amortization; interest, present and future values — even advanced trigonometry functions.

FormFiller also includes a time-saving "Lookup" feature that stores details such as part numbers, phone numbers, shipping and billing addresses, wholesale/retail prices, claim and case numbers and more — then with one menu selection, retrieves them and automatically fills them into proper position in the form.

How FormFiller Works:

Step 1 — Insert The Form Into Your Printer.

The secret to FormFiller's power is its ability to tightly synchronize the computer and printer for precise positioning. You begin by creating a template for each form, matching the exact spacing, position and size for each field or blank on the form and inserting captions, help and fill-in instructions if you like.



Simply insert a sample form into the printer, with the system prompting you for alignment with your printer head. You then invoke FormFiller's "print grid" command. This actually prints vertical and horizontal lines directly on the pre-printed form, with numbers along the top and the left margin. This grid, and the corresponding numbers, are your guide in establishing the coordinates for each print position on the form.

Step 2 — Locate Precise Print Positions.

Using FormFiller's new menu-driven interface, the next step is to create exact print positions for each blank on the form. It's fast and simple — just two keystrokes are required to establish a print position, defining it from starting point to ending point. And FormFiller allows you to adjust your print positions in any direction in increments of up to 1/720th of an inch for pinpoint-precise alignment. You can quickly create custom grids for complex or inconsistently spaced forms.

When the data positions have been located, FormFiller will automatically insert X's to represent characters so you can visually test alignment and inspect the spacing of the fill-in areas.

Step 3 — Preparing the 'Master Template.'

Once the coordinates for each print position on the form have been entered, you then enhance the "master template" for the form. FormFiller allows you tremendous flexibility to custom design master templates to fit the exact needs of your information flow and accommodate your data entry requirements. This master template controls the entire data entry process.

Step 4 — Swift, Simple Data Entry.

The master template for each form is stored for instant call up and fill-in anytime. FormFiller allows data to be entered into templates using any format: columns, prompts, or into the actual form image. The data is then automatically transferred to exact blank positions on the pre-printed form.

Extensive Math Capabilities.

FormFiller contains dozens of math and financial functions that can be used within the form. These functions can be embedded in the form templates and automatically activated when values are entered into certain fields. This allows interactions and relationships between all fields in the form. If you're filling in a mortgage form, for example, changing one number will change all subsequent values related to that number.

Use Existing Data To Fill In Forms.

FormFiller's advanced "merge" features allow users to instantly merge database information into their pre-printed forms from spreadsheets and relational databases simultaneously. Your existing data can be quickly imported (without conversion) using FormFiller's improved new import capabilities that support dBASE II, dBASE III, Lotus 1-2-3 (WKS and WK1), DIF and ASCII.

Automatic Look-up And Fill-in.

FormFiller streamlines data entry with its unique "look-up" feature. This powerful function eliminates data entry by providing instant access to details frequently required during fill-in. In preparing an invoice, for example, you can simply enter a part description and FormFiller automatically finds the part number, description, price — even the customer's shipping and billing address.

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taking apart someone's property (the handset and telephone wall plate).

On most systems, connecting to the red and green wires won't give you a dial tone anyway, because the system requires you to dial a prefix for billing purposes. Also, most modern hotels will make available to you a phone line for sending data.

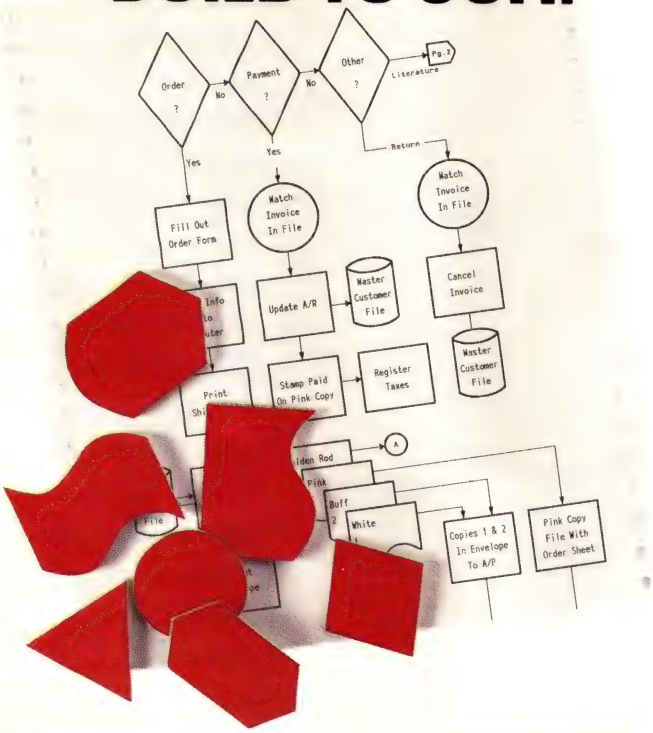
NORMAN REIN
SIMI VALLEY, CALIFORNIA

We consider it utterly irresponsible for modern hotels and motels not to provide data lines.

Those establishments that choose not to offer data lines take their chances with determined computer users.

You're right, however, to mention the dialing prefix. People who use their computers on the road need to include the prefix in their software's dialing instructions. —*Ron White*

BUILD TO SUIT.



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Analyzing a Press Release

"What's the Competition Up To?" (September, page 157) makes the serious charge that the PR Newswire "requires Talmudic analysis to derive any real intelligence." PR Newswire simply transmits press releases (almost 100,000 this year) to news media and the investment community. Analysis of our content is as easy as for any other database file. Perhaps the difficulty the author had was in searching via CompuServe's gateway rather than accessing it directly from one of more than a dozen databases.

JAMES O. BRAMS
VICE PRESIDENT, PR NEWSWIRE
NEW YORK CITY

By "analysis," I referred to the content of the information, not the search interface on the system. Although press releases can allude to valuable information about your competitor's future *direction, they typically require interpretation. If you want to know what your rival is up to* today, *learning about it from a press release generally means it's too late to do anything about it.*

—*Marty Jerome*

Illiterate Grammar Checkers?

In your September Letters column (page 28), a man who runs a small government office writes in to praise grammar checkers. It is a sad confirmation that the people who inject Big Brother into our lives cannot write clear English.

Whatever happened to "Reading, 'Riting and 'Rithmetic" in school? Do you think the PS/1 will change all this?

W. RICHARD BARLOW
WILLIAMSVILLE, NEW YORK

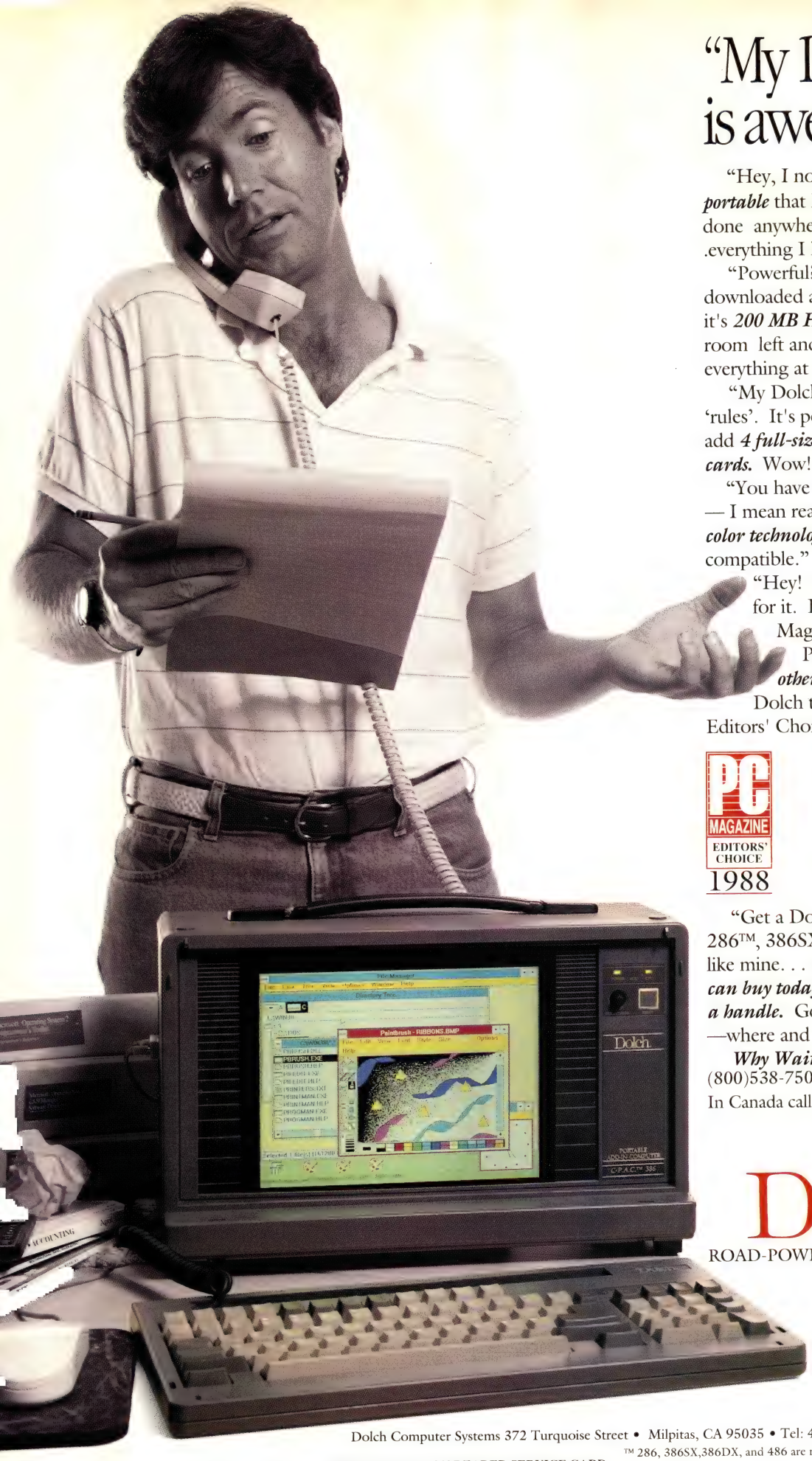
RightWriter—supposedly the premier grammar checker on the market—commits a flagrant grammar error each time it notifies the user of an error.

When I write, "The current status of national marketing," RightWriter tags it with: "Redundant. Replace *current status* by *status*." It should obviously instruct me to replace "current status" *with* "status."

J.P. MEREDITH
DUBOIS, PENNSYLVANIA

Shrinkage for dBASE Backup

"More Compact Backup for dBASE Files" (Software Secrets, September, page 186) really takes the hard route.



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"Powerful? You bet! After I downloaded all my desktop stuff, on it's ***200 MB HD***, I still had plenty of room left and it screamed through everything at ***11 MIPS!***"

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Letters

Instead of redoing your DBF file by 50 percent, why not use the shareware program PKzip to shrink it by 85 percent? Used with batch files, this method acts as a great hard disk manager and backup tool.

For instance, I use a batch file, BU.BAT, that updates new or changed files in a directory, then copies them to a floppy for backup. The batch file includes the statement "PKZIP -U MEMBERS" (MEMBERS is the name of my DBF file).

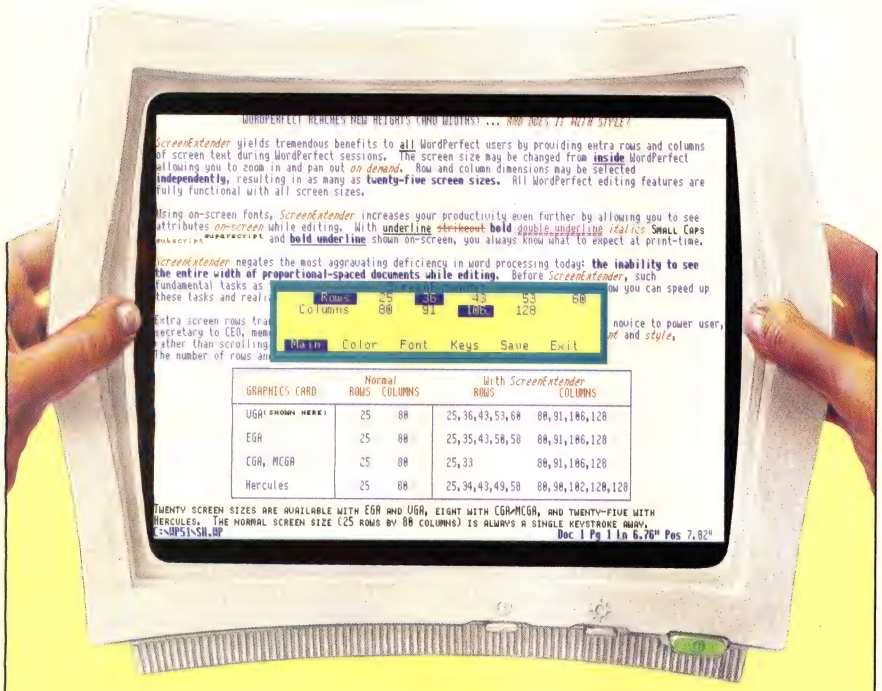
STEWART DAVIS
SYRACUSE, NEW YORK

A Poor Man's File Transfer

According to Q&A (Help, September, page 210), you can transfer files from a PS/2 to an XT via a null modem. If you are a poor country boy like me, you can transfer files without buying fancy software by using a null modem cable and DOS commands.

RALPH DAVISON
ENCINITAS, CALIFORNIA

The null modem is a $10-or-less device that converts a normal serial cable into a null modem cable. The device is often less expensive than buying a null modem cable. —*Ron White*



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Window-Washing WordStar

I take issue with the innuendo that WordStar does not "do windows" (Software Secrets, September, page 190). WordStar has had windowing capability since Version 5.0, two years past.

JULIE ROSENBERG
MIAMI

Struck by Lightning

The reference to lightning in the headline and in the body of "If Lightning Strikes" (Prime Time, September, page 286) may have misled readers to believe that Curtis surge protectors guard against lightning.

This is not true.

PENNEY PATTERSON
VICE PRESIDENT, CURTIS MANUFACTURING
JAFFREY, NEW HAMPSHIRE

A lightning bolt need not hit a power line to cause damage. The electromagnetic fields produced by lightning can also cause disturbances along power lines. —*Wendy Taylor*

For the Record

The Kodak Diconix 150 Plus printer retails for $519 ("Canon's Little Printer Is Big News for Laptop Users," New, September, page 39), which means that it cost $20 more than the Canon BJ-10e, not $100, as stated.

In "The Ultimate Computer CEO" (September, page 173), Face Software Inc. was misidentified.

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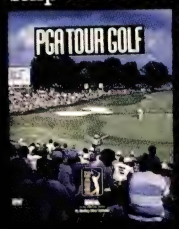

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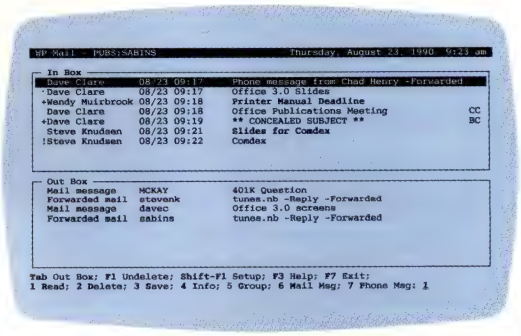
And if you're worried about something you may have said, don't worry. E-Mail even gives you control over messages that have been sent. It lets you see when a message



E-Mail

ever communicate before Office™ 3.0?

as been delivered, opened or deleted. Then it lets you retract change it and send it back again.

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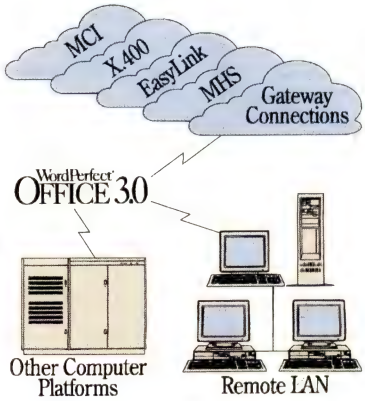

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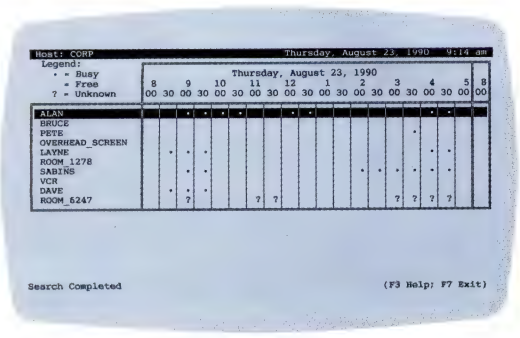

Scheduler

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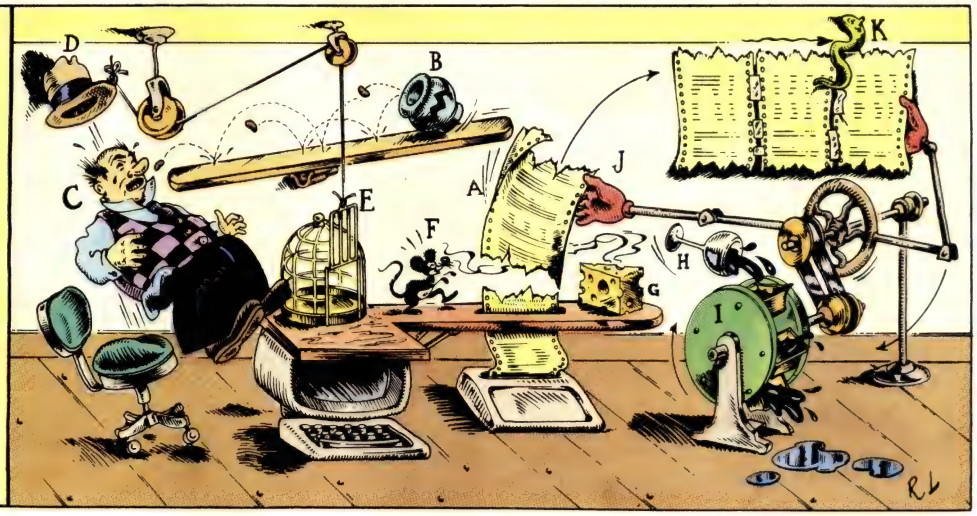
RISING SPREADSHEET (A) KNOCKS MEXICAN JUMPING BEANS (B) INTO MOUTH OF NEUROTIC MAN (C) WHO IS SO DISCOMBOBULATED THAT HIS HAIR STANDS ON END, DISLODGING HAT (D) WHICH OPENS CAGE (E) AND RELEASES EPICUREAN MOUSE (F).

MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).



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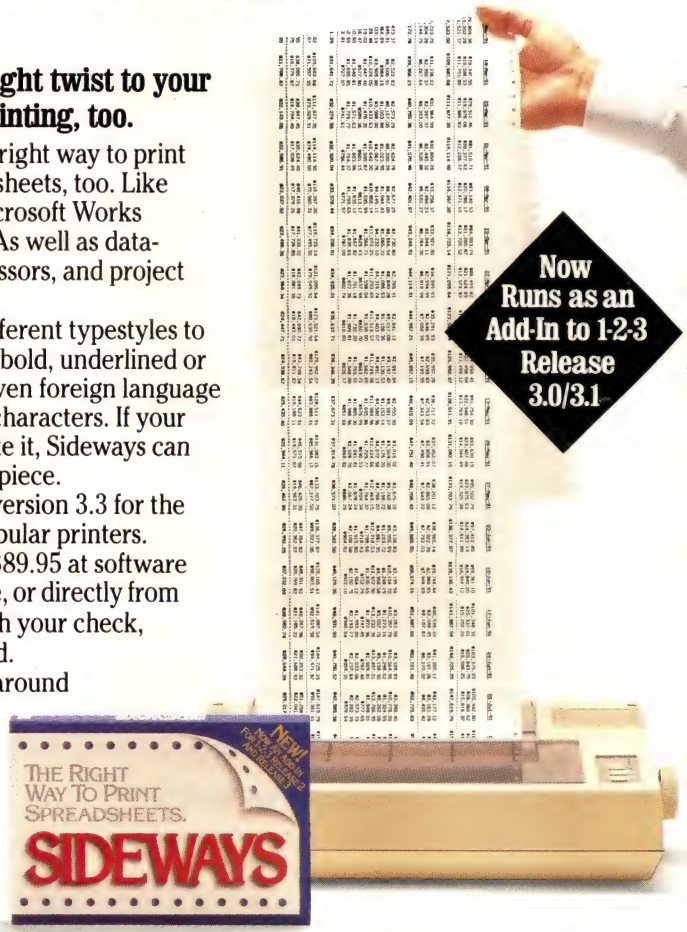

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New!

What's New!

46 David DeJean has the lowdown on What's Up! in the world of PCs

46 New ScanMan Model 256 offers greater "scanability" and image editing

48 Version 1.1 of the SuperPrint font manager for Windows boasts on-the-fly font scaling and dot matrix printer support

62 An Isopoint pointing device distinguishes the GRiDcase 1550sx as a true Windows laptop

64 Desqview 386 Version 2.3 and its QEMM memory manager are now compatible with Windows

66 The CompuAdd 425 is a trim 486 machine that's best suited to individual users

68 Legacy explores word processing, desktop publishing and drawing

78 NEC's Silentwriter2 Model 90 laser delivers PostScript/PCL printing at a cost you can live with

80 ATI's VGABasic-16 card is small in size and cost, but it's got all the features you need

82 With the PerForm Pro forms creation package, data entry is a simple matter of filling in the blanks

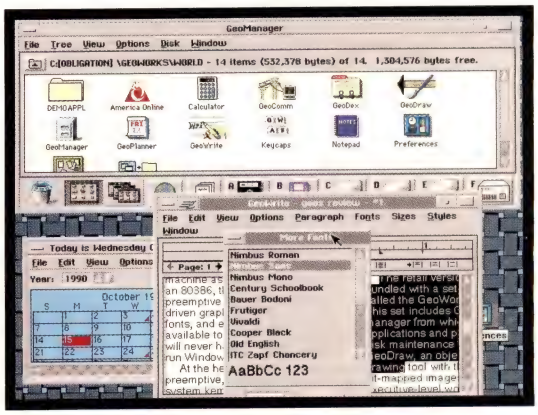
GeoWorks Ensemble Is A One-Size-Fits-All GUI

If Windows 3.0 and OS/2 have convinced you that multitasking graphical operating environments can run only on 80386 PCs dripping with gobs of memory, the $195 GeoWorks Ensemble will be a pleasant surprise. (It's an MVP Awards winner, too; see page 86.) Incredibly, this new environment from tiny GeoWorks runs as smoothly on a 640K XT-class machine as Windows 3.0 does on an 80386, making the power of true multitasking, scalable fonts, exceptional printer output and a mouse-driven graphical user interface available to 20 million PCs that will never have the horsepower to run Windows or OS/2.

At the heart of GEOS, the GeoWorks operating system, is a multitasking operating system kernel that runs on top of DOS, using it for file input/output operations only. Multitasking lets you manage several chores at once, but only GEOS-specific programs can take advantage of this capability. When you launch a DOS application, GEOS shuts down, leaving in memory a less-than-1K hook, with which it reloads when you quit the DOS program.

The GeoWorks interface shell is a highly customizable graphical user interface that runs on top of the GEOS kernel. The initial version of GeoWorks Ensemble uses the Motif user interface designed by the Open Software Foundation for Unix systems, but GeoWorks has also demonstrated Open Look– and OS/2 Presentation Manager–like interfaces. All the GeoWorks front ends offer advanced features, such as tear-off menus and cascading menus, and all respond crisply, even on 6MHz ATs and 8088- and 8086-based PCs. A unique feature of the GEOS user interface is a quality that GeoWorks calls "scalability," which means that it can work either in a scaled-down, "appliance level" mode (in which applications run in a full-screen, single-tasking state) or in a "professional level" mode (in which the full multitasking, windowing capabilities of the environment come into play).

Despite its ability to run on low-powered machines, GEOS isn't limited to them. It takes good advantage of additional memory and faster processors. On an 80386 with 4MB of RAM, its performance is stunning.



GeoWorks Ensemble is a full-fledged multitasking environment. Sharing the screen shown here are GeoPlanner and GeoWrite, two of its many applications.

The name GeoWorks Ensemble implies a set of applications, and that's what you get. Among these are GeoManager, GeoDraw, GeoWrite, GeoComm, *(continued)*

The Bottom Line GeoWorks Ensemble is the first multitasking graphical user environment fast enough for an 8088.

GEOWORKS ENSEMBLE, $195. GeoWorks, 2150 Shattuck Ave., Berkeley, Calif. 94704; (415) 644-0883.

GEOWORKS, *from page 45*
GeoPlanner, GeoDex, a notebook, a calculator and a scrapbook. GeoManager is a file manager from which you launch applications and perform file and disk maintenance functions. It supports filenames of up to 32 characters and provides multiple windows and views of your disk—including icon-based views of applications and documents and a hierarchical tree view. GeoManager also lets you launch applications by double-clicking on their names or icons.

GeoDraw is a vector-based drawing tool with the ability to import bit-mapped images. GeoWrite is an executive-level word processor with exceptional font and layout controls. GEOS's basic terminal package, GeoComm, provides Xmodem file transfers. The flexible calendar program GeoPlanner supports multiple schedules, recurring events and multiple alarms. GeoDex is a card file database with phone-dialing capability. Both GeoWrite and GeoDraw benefit greatly from the GEOS environment's 21 scalable typefaces. Overall, the applications are considerably more useful than those included with Windows. They also demonstrate that it's possible to write fast, powerful applications for Ensemble.

GEOS has already impressed enough people in the PC industry that a half-dozen or more hardware vendors started bundling it with their systems this fall. In addition, several major software vendors, including Lotus and Borland, are rumored to be developing GEOS applications. But until third-party applications and LAN support appear, GEOS is best suited for home and small-business use. That could change as more applications appear, and given the PC industry's increasing nervousness over Microsoft's domination of the system software arena, GEOS may well find itself with many friends in the coming years. **PAUL BONNER**

Logitech Puts Gray-Scale Scanning in Your Hand

Logitech's ScanMan Model 256 will delight fans of hand scanners and convert skeptics. (So, not surprisingly, it won an MVP Award; see page 86.) Its ability to scan images of up to 256 shades of gray at 400 dots per inch is a major step forward for the popular ScanMan line, and its new, Windows 3.0-based image capture and editing software, Ansel, is an equally impressive move toward usability.

The 8-bit scanner looks almost identical to the earlier 1-bit ScanMan Plus. The Model 256 comes in the same easy-to-hold, wedge-shaped case and features the same 4.1-inch scanning width. But while the earlier model used software dithering to provide 32 shades of gray, the Model 256 offers true 256-gray-scale scanning, producing images of near-photographic quality. Also, the new ScanMan affords 64- and 16-gray-scale modes, as well as a black-and-white mode for line art. All four settings are available in resolutions of 100 to 400 dpi.

Earlier models of the ScanMan were criticized for a tendency to wobble during long scans, causing straight lines to reproduce as curved or irregular. Logitech corrected this in the Model 256, which glides smoothly in a straight line, making it easy to control even on long scans.

Hand scanners in general have also taken heat from critics who claim that their limited scanning width renders them unsuitable for most optical character recognition tasks. The critics are right: Flatbed scanners are generally more appropriate for OCR tasks. But hand scanners are good at scanning images for desktop publishing. So, while files created using the ScanMan Model 256 can be used with OCR software, *(continued)*

The Bottom Line The ScanMan and its Ansel image-editing software are the best Windows scanning environment.

SCANMAN MODEL 256, $499; Micro Channel version, $599. Logitech, 6505 Kaiser Drive, Fremont, Calif. 94555; (415) 795-8500.

WHAT'S UP!

By David DeJean

PS/1 CONUNDRUM

Coverage of *PC/Computing's* MVP Awards (page 86) reveals that there was a noticeable lack of consensus among the magazine's staff over IBM's PS/1. So audible was the lack of consensus that even people on other floors of our building must have noticed. Some of us thought the PS/1 was an MVP-class idea. Others thought it was junk. The final MVP votes were a private ballot, but just between you, me and the gatepost, I don't mind telling you that I think the PS/1 is...well, it's a severely limited machine.

For instance, I hate *the idea* that I have to spend $169 for the PS/1's expansion chassis just to use a handheld scanner. On the plus side, the PS/1 is priced a lot more realistically than comparable models in the PS/2 line. It's kind of cute, too, and it might make a decent network workstation—which was apparently the deepest fear of some folks within IBM. Indeed, when the PS/1 was introduced, rumor had it that "Blue to you" was going to automatically void the warranty of any PS/1 with a network card installed.

Never mind how they'd enforce that one. The point is that even after some price cuts among the PS/2 Model 25s and 30s, a PS/1 is still at least $300 cheaper than the comparable PS/2s—unless you take into account that cursed expansion chassis.

That's why an enterprising networking company, US Sage of Longwood, Florida, has introduced the MainLan for PS/1, an Ethernet card that fits inside the PS/1 case. The $199 adapter features both coaxial cable and 15-pin connectors, and works with US Sage's MainLan NetBIOS-compatible operating software and Novell's Netware.

US Sage's parent company, The Sage Group, is British. In England, Big Blue is pushing the PS/1 as a small-business workstation (while it beats the drums for a home market in the United States; apparently, IBM is more realistic overseas). *(continued)*

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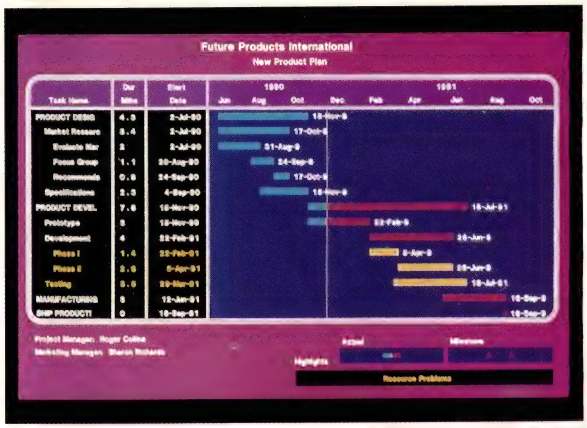

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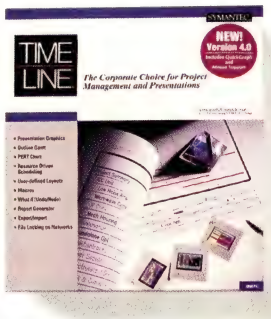

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SCANMAN, *from page 46*
Ansel concentrates on image creation and editing.

In addition to the Windows-based Ansel software, ScanMan ships with a plain-Jane DOS command-line utility called Scan, which is good in a pinch. Scan provides a way to control the length, width and file format (TIFF, PCX and BMP are supported) of a scan, but offers no editing features. Ansel reaches beyond scanner-control functions to deliver high-quality gray-scale-editing capabilities. While its editing tools aren't the equals of those in packages like Gray/FX from Xerox and Image-In from Image-In Inc., they are well geared to the needs of most handheld scanner users. Ansel's ability to "stitch" together images lets you capture originals longer or wider than the 4.1 by 20 inches of its maximum scanning area.

The wedge-shaped ScanMan Model 256 fits comfortably in your hand for smooth scanning.

Ansel also offers brightness and contrast controls and commands to lighten, darken, sharpen, smooth and equalize gray-shade distribution. These can be applied to the entire image or to a selected area. You can also touch up an image using a variety of brush shapes and any of 256 shades of gray, and you can transform an image by rotating it left or right, flipping it horizontally or vertically, converting it to black and white or inverting it (creating a negative image).

Ansel provides a remarkable range of copy and paste options. Its Copy Setup menu controls resolution levels and the number of gray shades in images copied to the clipboard. Its Paste Setup and Paste From menus let you paste from the clipboard, from a previously saved scanned image or from a new scan.

The graphics-capable word processors now available under Windows all but demand a ready source of images, and the new ScanMan is prepared to meet that need. Its 256-shade gray-scale capabilities are sharp enough to be just what the doctor ordered for scanning photographs and line art, and its Ansel software is strong enough to make the ScanMan Model 256 *the* hand scanner for Windows users. **PAUL BONNER**

SuperPrint: Print Power To Fortify Windows 3.0

The SuperPrint font manager for Windows has always provided scalable printer font technology and fast printing. But until recently, it printed only to Hewlett-Packard's LaserJets, DeskJet and PaintJet. What's more, it didn't support the scale-on-the-fly screen font features found in newer font products, such as Adobe Type Manager for Windows and Bitstream's FaceLift. (See "Windows Fonts: Jagged No More" in our November 1990 issue, page 134, for a close look at ATM and FaceLift.)

Now, with Version 1.1 of SuperPrint, Zenographics has *(continued)*

The Bottom Line SuperPrint 1.1 is the fastest-printing scale-on-the-fly font manager.

SUPERPRINT 1.1, $195. Zenographics, 4 Executive Circle, Suite 200, Irvine, Calif. 92714; (800) 366-7494, (714) 851-6352.

ALL PHOTOGRAPHS BY STEVEN GREENBERG

WHAT'S UP!

US Sage is betting that if the PS/1 catches on in the States, it will be for the same sorts of uses that IBM is pitching in Jolly Old England; that is, as a small office/Mom-and-Pop network machine—no matter how many Big Blue vice presidents insist it's not a network machine.

If you've got a radical streak, it all comes down to this: Buy a couple of PS/1s and Ethernet adapters—US Sage (800-999-6770) will sell you a PS/1 starter pack, including two Ethernet cards and its MainLan software, plus some thin coax to connect them, for $499. Send the warranty cards back to IBM, insert the adapters, transfer a file—and wait for the "boys in blue" to knock at the door.

DOING WINDOWS

It looks as if any major upgrade to Windows 3.0 won't appear until the second quarter of next year (Microsoft continues to struggle with TrueType font technology), but minor improvements are trickling out, like the Windows Supplemental Driver Library, a collection of 126 or so drivers for printers, displays and various flavors of Novell NetWare. These drivers were developed by hardware vendors, then tested and certified by Microsoft. The set includes improved LaserJet drivers with support for the LaserJet IIID; drivers for a dozen PostScript printers that weren't included in the original Windows 3.0 driver set; several drivers for Super VGA video cards from ATI, Paradise, Video 7, DGIS and Chips and Technologies; and drivers for the Canon laser and BubbleJet printer lines. The library can be downloaded from several online services, including CompuServe and GEnie, and may be copied freely. It's also available from Microsoft on disk for $20 by calling (800) 426-9400.

Merrill & Bryan Enterprises of San Diego, California, has integrated Microsoft's virtual device driver (VxD) for memory managers into EMS Version 6.0, which will be compatible with Windows 3.0. The new version *(continued)*

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Home Phone (_____) _____

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City _____ State _____ Zip _____

Since? (Mo./Yr.) _____ ☐ Buy ☐ Rent ☐ Other _____

Previous Address _____

Employer _____ Since? (Mo./Yr.) _____

Monthly Gross Salary $ _____ Bus. Phone (_____) _____

Previous Employer _____ From - To

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Additional Monthly Income $ _____ Source: _____

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_____ Relationship _____

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PLEASE TELL US IF YOU HAVE: Checking Account ☐ Yes ☐ No
Savings Account ☐ Yes ☐ No

	Y/N	How Many?		Y/N	How Many?
Bank Loan	___	_____	Dept. Store Charge Card	___	_____
VISA	___	_____	Credit Union Account	___	_____
MasterCard	___	_____	Other Major Charge Cards	___	_____
Finance Company Loan	___	_____			

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Address _____ Apt. _____

City _____ State _____ Zip _____

Home Phone (_____) _____ Date of Residence _____ (Mo./Yr.)

Joint Applicant's Employer _____ Since? (Mo./Yr.) _____

Bus. Phone (_____) _____ Monthly Gross Salary $ _____

D. SELF-EMPLOYMENT INFORMATION

Business Name _____

Type of Business ☐ Proprietorship ☐ Partnership ☐ Corporation

Business Phone (_____) _____

In Business Since _____

Your Annual Income From Business Gross _____ Net _____

Personal Banker's Name _____

Banker's Telephone Number (_____) _____

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Date _____

Joint Applicant's Signature _____

Date _____

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Buyer's Signature _____ **Date** _____

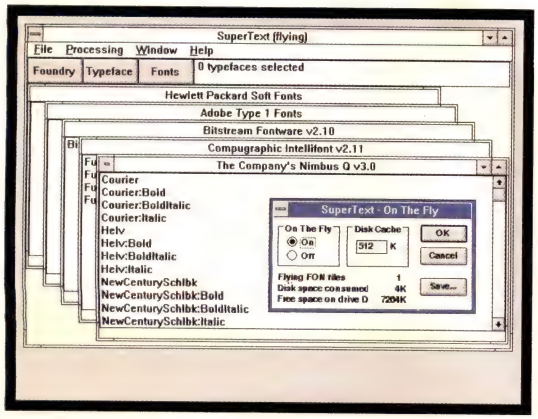
CIRCLE NO. 125 ON READER SERVICE CARD.

(EXC. AK & HI)

SUPERPRINT, *from page 48*
added on-the-fly font scaling (under Windows 3.0) and support for dot matrix printing. (It's an MVP Awards runner-up; see page 86.)

SuperPrint is really several products. The SuperText Manager lets you select the typefaces you want, then generates the corresponding screen fonts on the fly or in a separate step if you prefer to build screen fonts all at once. Because the on-the-fly feature actually generates a complete bitmap of the character set at a particular point size, the operation is slower than with FaceLift or ATM, which keep the fonts in RAM. Zenographics also offers a simple way to remove typefaces you're not using anymore, making the product work like FaceLift and ATM.

The SuperQueue printer spooler replaces the Windows Print Manager. Like Print Manager, SuperQueue is designed to accept a file for printing and return control of the PC to you. The difference is that SuperQueue is much faster than Print Manager, and by extension, it's faster than both ATM for Windows and FaceLift.



Under SuperPrint 1.1's SuperText Manager function, you can select from a variety of different font types and then generate "on the fly" the font that you want to use.

The only significant drawback to SuperPrint 1.1 is that it does not support PostScript-only printers. That is, it can't send PostScript code to a PostScript printer. It can, however, interpret PostScript outlines and send them as bitmaps to Hewlett-Packard-compatibles and a wide range of dot matrix printers. In fact, one of SuperPrint's strong suits is that it protects your investment in font technology. If you own type from any of the following type libraries, you already own typefaces that will work with SuperPrint 1.1: Adobe Type 1 (and PostScript Type 1 compatible scalable outlines from other vendors), Bitstream (both Speedo and Fontware formats), Agfa Compugraphic (IntelliFont), Digital Typeface's Nimbus Q (the URW typeface library) and Hewlett-Packard SoftFonts. In addition, SuperPrint bundles a selection of 22 typefaces with the product, which includes Times Roman, New Century Schoolbook, Bitstream Charter and Helvetica.

One the most important benefits of Windows scale-on-the-fly font-management programs like SuperPrint 1.1 is that they're able to provide quick, accurate screen representations of the typefaces and point sizes you're printing. This can be crucial to artists and designers. SuperPrint provides a complete replacement for both printer and screen fonts, so you'll see exactly what you'll get from the printer.

For $195, Zenographics sells an additional 22 typeface outlines that, coupled with the original outlines, provide a subset of 35 typefaces equivalent to those originally supplied with Apple LaserWriter printers. Zenographics also sells versions of SuperPrint that are designed to support specific high-end output devices, such as film recorders and thermal transfer printers.

Another advantage of SuperPrint is that its rasterization process prints graphics as well as text. As a result, the program delivers gray tones and detail that Windows can't provide on its own.

ATM for Windows and FaceLift may offer quicker onscreen font rendering, but SuperPrint provides faster printing and broad support for industry-standard font formats. If you've already got a large investment in fonts from more than one type company, or if you just don't want to wait while Windows manages your printing, SuperPrint 1.1 is the best solution for you. **DALE LEWALLEN**

WHAT'S UP!

also has an auto-installation function (619-689-8611).

The K5200 Scanning System from Xerox Imaging Systems of Cambridge, Massachusetts, has a new Windows 3.0–based graphical user interface—something the company's Mac-based optical character recognition systems have and its DOS-based systems have sorely needed. Attached to any PC capable of running Windows, the interface adds page preview capabilities to the system (617-864-4700).

Image-In Inc. of Minneapolis has added support for the Hewlett-Packard ScanJet Plus flatbed scanner to its Windows 3.0–based graphics capture package, Scan/Paint and Plus, a gray-scale editor (612-888-3633).

Raima of Bellevue, Washington, is adding a couple of SQL-based query- and report-writing tools to dbVista III, its Windows-based database management system. dbQuery, a developer's tool delivered as a dynamically linked library (DLL), will be included with the $595 dbVista III. Raima's $99 tool for end users, EasyQuery, lets them create reports without knowing SQL. Raima has also released a "developer's edition" of dbVista III for $195. It's a fully functional version of the code, but it doesn't include a distribution license for applications developed with the package (206-747-5570).

Prisma Software has added features to YourWay, its personal information manager, and cut the price from $289 to $199. The Cedar Falls, Iowa, company has added the ability to display multiple card files (the program's data files) onscreen, and to export card files to DBF, DIF and text files, among other enhancements (800-747-0319).

THE BIG PICTURE

Maybe it's because of Windows 3.0 and GUIs in general, but monitors seem to be getting more attention now than they have for a while. Several new companies are introducing products, established companies are cutting prices and performance is generally improving. ***(continued)***

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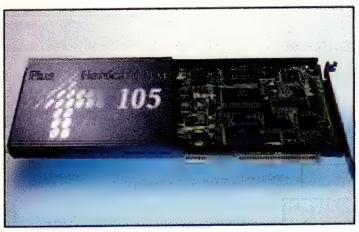

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CIRCLE NO. 168 ON READER SERVICE CARD.

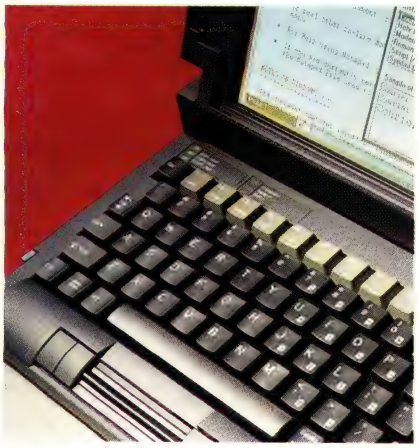
New!

The GRiD 1550sx Is the Ultimate Windows Laptop

Mice can't fly. Sure, you can get a battery-powered portable with a bright enough screen, a big enough hard disk and sufficient processing power to run Windows 3.0, but what do you do for a mouse pad on an airplane—ask the person next to you to lower his or her tray table?

The portability pioneers at GRiD Systems have a better answer. The GRiDcase 1550sx is the first DOS laptop with an innovative pointing device built into the keyboard.

The 14-pound, $6,195 GRiDcase has attractive specifications in its own right—a 20MHz 386SX; a backlit, VGA-compatible display; and a swift 60MB hard drive (a 120MB drive is optional for $700 more). But the machine's main attraction is the Isopoint control bar located below the spacebar.



The Isopoint pointing device included with the GRiDcase 1550sx is more convenient than a mouse for use when traveling.

Slide the Isopoint left or right or roll it toward or away from you, and the pointer moves onscreen just as if you were moving a Microsoft mouse. Pressing down on the rod or on the buttons that are paired at either side of it is the equivalent of clicking a mouse button.

Expert users can keep their fingers on the home row of the keyboard and flick the bar with the side of a thumb. This method works for simple mouse actions, such as word-processing cursor movement, but you'll probably find yourself steering the Isopoint with one hand off the keyboard, or even both hands, for careful click-and-drag work. The Isopoint is no match for a real mouse, but it feels more natural than a trackball, and its built-in convenience is an undeniable plus.

So is the 1550sx's performance. Its 20MHz 386SX processor, and particularly its 18-millisecond-average-access-time hard disk with 64K caching controller, make the GRiDcase as quick as many 20MHz 386DX desktops. It breezes past 16MHz SX portables easily.

The brightly lit, black-on-white, 8-by-6-inch LCD screen shows VGA graphics well, easily displaying 16 gray scales and letting you cycle through seven shade palettes from the keyboard. You can also switch to an external VGA monitor, though the GRiD can't make simultaneous monitor and LCD presentations. Besides the monitor port, there are two serial ports, a parallel port and sockets for a full-size keyboard and proprietary GRiD peripherals like external floppy drives. An internal 2,400-bps, MNP Level 5 modem is a $595 option.

The standard amount of memory is 2MB, expandable to 8MB if you don't mind buying RAM over on Rodeo Drive: GRiD charges $1,190 for an upgrade to 4MB and $3,295 to upgrade to 8MB, and you've got to go through the company. To make the most of that memory, both Windows 3.0 and Qualitas's 386-to-the-Max memory manager are included.

Options are a little flip-flopped. MS-DOS 4.01 is a "mandatory option" at $150, while the GRiDcase's battery, also $150, is *not* standard equipment. Battery life ranges *(continued)*

The Bottom Line Look, Ma, no mouse—GRiD is first out of the gate with a fast, Isopoint-equipped Windows laptop.

GRIDCASE 1550SX, $6,195 with 2MB of RAM and a 60MB hard drive. GRiD Systems, 47211 Lakeview Blvd., Fremont, Calif. 94538; (800) 222-4743, (415) 656-4700.

WHAT'S UP!

Keypoint Technology, of Santa Fe Springs, California, says it's trying to build monitors with NEC performance at non-NEC prices. The result is the clear, precise ViewSonic 4 display. The product is actually two in one—a $595, 14-inch monitor and a $395 video card. The monitor displays 256 colors at up to 1,024-by-768-pixel resolution and .28-mm dot pitch; it works in MCGA, VGA, Super VGA and 8514/A modes as well as analog RGB video. The 16-bit VGA card comes with 1MB of video memory. A quick look at the combination revealed extremely vivid images and not even a hint of flicker (213-944-3041).

Even NEC is moving to non-NEC prices, by the way. It cut the suggested retail price of its Multisync 4D monitor from $1,799 to $1,499. The Wood Dale, Illinois, company sees a future in Windows, evidently, and believes its 16-inch 4D will find favor among users upgrading from smaller displays (708-860-9500).

If big is good, bigger must be better, and a bargain is best of all: Seiko Instruments Inc. of San Jose is throwing in a video card with its 20-inch CM-2050 color monitor, a 1,024-by-768 non-interlaced display built around a Sony Trinitron CRT that lists for $2,999. The card, Orchid's ProDesigner II, supports 256 colors on the Seiko monitor and comes with drivers for applications including Windows 3.0, AutoCAD, Ventura Publisher, GEM and others. The one hitch is that the deal is good only through the end of the year (408-922-5900).

Speaking of bigger, Moniterm has produced Windows 3.0 drivers for its Viking large-screen monitors and controllers that extends a virtual desktop to 2,048 by 960 pixels. With a 19-inch monitor, this yields a 23-by-11-inch work area, so you can open more windows onscreen or display multiple page-size documents. The Minnetonka, Minnesota, company will send you the drivers free if you bought a Viking product after May 22. Otherwise, they're $50 (800-933-5740).

RasterOps, a leading monitor maker in the Macintosh ***(continued)***

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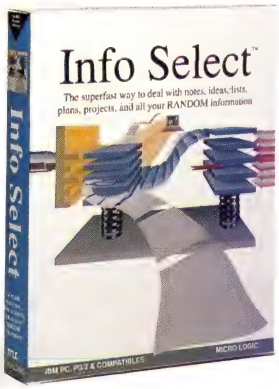

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BASIC OPERATION: You will see several windows of different sizes side-by-side on your screen. Info Select windows can hold: notes, plans, lists, facts, letters, contacts, and much more. You can: open a new window, type into it, and shape it; edit an existing window; resize, remove, or print a window; browse through windows with the arrow keys; search for a group of windows related by a word or phrase; hot-key between INFO SELECT and a wordprocessor or spreadsheet; and much more. **EASY POWERFUL FEATURES:** five ways to see overviews; hypertext; fast sort; line drawing; date tickler; dialer; searching by text or date ranges; add columns of numbers; 3-D wordprocessing; support of some commands of popular wordprocessors; can store data in EMS; template or free-form windows; import and export files, screens, and databases; move, join, and duplicate windows; efficient on portables; stand-alone or memory-resident; pull-across menus; and much more. Data is structured in multiple stacks of intelligent text windows; uses a unique easy powerful system of parallel text processing and progressive resolution searching without keywords. Version available with LAN file locking and sharing. **SPECIFICATIONS:** infobases up to 10 megabytes; text searches up to 700kb/sec; up to 32,000 characters per window; up to 64,000 windows per infobase; takes just 7K in swap mode; for the IBM PC/XT/AT/PS2 and true compatibles; not copy protected. **MAIL ORDERS:** Send name, address, phone number, and payment by check, Visa, or MC to address shown. Please include $3.50 shipping ($10 outside continental USA). 30 day money back guarantee. **TORNADO OWNERS:** INFO SELECT includes everything in Tornado and much more. Call today for our special limited time trade-up offer. **EUROPEAN CUSTOMERS:** Contact Atlantex U.S.A. (203) 655-6980. **TRADEMARKS**: Trademark (owner): Tornado and Info Select (Micro Logic), Agenda (Lotus Development), Sidekick (Borland International), Grandview (Symantec), IBM PC, XT, AT, PS/2 (IBM). © 1990 Micro Logic Corp. U.S.A.

GRIDCASE 1550SX, *from page 62*
from an hour and a half to two hours, helped by a standby mode that shuts down the screen, hard disk and CPU—everything but system memory—after an interval without keyboard activity. GRiD warns that some programs may work better with the standby feature deactivated. It closed down a Windows Solitaire game, for example, because you use the Isopoint only, not the keyboard, when playing Solitaire. The manual also warns that, while the standby feature works fine in Windows' Enhanced mode, it crashes the Standard mode, presumably because the feature attempts to directly address the 386 chip to reduce its power.

The standby function lets you swap battery packs without shutting down, though the battery fits so tightly, you must scrabble with your fingernails to remove it. Recharge time is two and a half hours with the computer off, eight hours with it on.

Solid construction and sleek black magnesium cases are GRiD traditions that continue here, as does the cramped GRiD keyboard. The keys have a good, firm typing feel, but the 77-key layout is awkward, with the backslash where your fingers expect to find the backspace. Several keys—including the cursor arrows, Home, End, PgUp and PgDn keys—are doubled up and dependent on a function key. Some typists may find the keys set rather far back behind the Isopoint palm rest.

Once you get used to the keyboard and Isopoint, the GRiDcase 1550sx is an attractive package—although hardly a bargain at $6,495 with DOS and a battery. Nevertheless, it's priced competitively with Isopointless portables from Compaq, NEC and Toshiba. Lighter, notebook-size laptops with pointing devices should be on the way, but until then the 1550sx is the winning Windows-to-go machine. **ERIC GREVSTAD**

QEMM 5.1 Frees High RAM For Windows 3.0 Users

The big news in Version 2.3 of Quarterdeck's Desqview 386 is that it supports Windows 3.0. (Other news: It's an MVP Awards winner; see page 86.) QEMM 5.1, the latest incarnation of the program's memory manager, now works in all three modes of Windows 3.0, giving you more RAM for character-mode DOS applications under Windows. Plus, you can use the full Desqview 386 product to run Windows 3.0 and its applications within the Desqview environment.

Desqview 386 is a marketing bundle consisting of QEMM 5.1 and Desqview, a character-based multitasking operating environment. The product is also bundled with Manifest, a $59.95 utility that analyzes memory usage and suggests ways to improve its efficiency. The three programs are sold separately as well, and many Windows users will find that QEMM 5.1, which costs $99.95 on its own, is all they need.

QEMM started life as an expanded memory emulator for 80386 PCs, converting extended memory, normally unusable by DOS, into EMS-compliant expanded memory for use by applications such as Lotus 1-2-3 Release 2.01 and Desqview. But its most important capability is getting at the normally underutilized memory between 640K and 1MB. QEMM's LOADHI function stores device drivers, TSR programs, disk caches, network software and DOS resources, such as the memory reserved for the FILE and BUFFER statements, in this high RAM area—freeing the memory they would normally occupy in DOS's 640K memory space for use by other programs.

The memory manager is designed to be used in combination with Manifest and a second *(continued)*

The Bottom Line QEMM 5.1 lets you push TSRs and device drivers into high RAM while running Windows 3.0.

DESQVIEW 386 VERSION 2.3, $219.95. Quarterdeck Office Systems, 150 Pico Blvd., Santa Monica, Calif. 90405; (213) 392-9851.

WHAT'S UP!

world, has made a splashy foray into PCs with the introduction of the $4,395 RasterOps 1024MC, a 24-bit color display card for IBM's Micro Channel PS/2 line and compatibles. Support for 24-bit color is available in or promised for upcoming versions of several PC applications, including Corel Draw, Microsoft PowerPoint, PageMaker 4.0 and Arts & Letters. RasterOps is strongly considering developing 24-bit boards for the AT bus, and possibly for the EISA bus, too (800-468-7600).

Copam USA Inc. has released a low-radiation 14-inch VGA monitor, the 1400/22LR. It operates at a vertical frequency of 60 to 70Hz for less visible flicker. The Fremont, California, company says the $299 display is the first of a line of low-radiation monitors that will meet Swedish national standards for low-frequency radiation (800-828-4200).

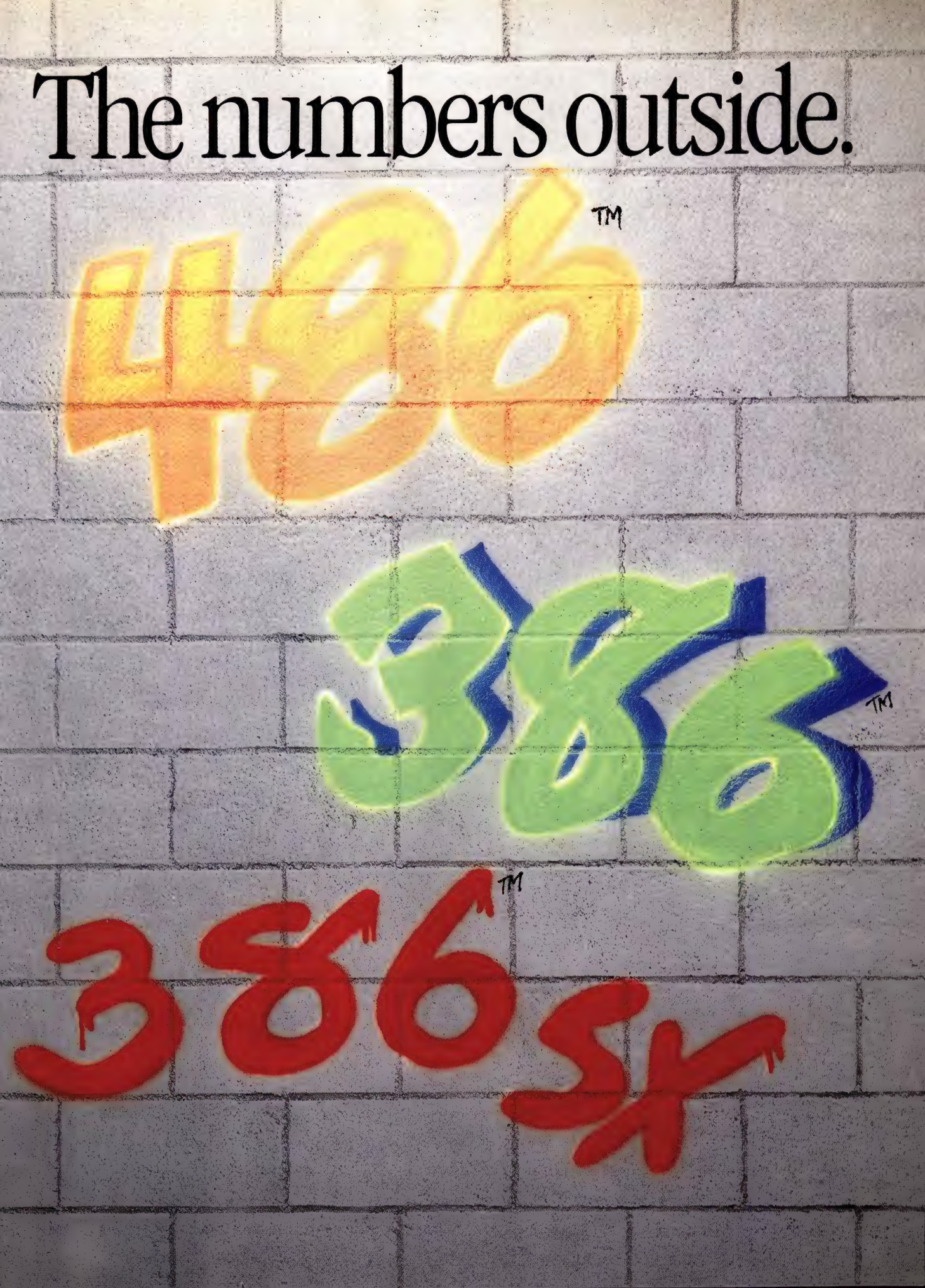
EMULATE THAN NEVER

Pentax Technologies of Broomfield, Colorado, has done something more scanner vendors should do. A driver for its IQ Scan SB-L301 lets the legal-size flatbed scanner *emulate a* Hewlett-Packard ScanJet Plus.

The good thing about the ScanJet isn't what it does, in *particular*. Oh, it's a good enough scanner, but what sets it apart is the large number of applications that support it. There's no standard for full-page scanners along the lines of, say, what the Hayes AT command set has become for modems. Every scanner works differently and needs special treatment from application software. As graphics and optical character recognition become more important, the knot of confusion over which scanners work with what software will only get worse. The ScanJet is supported by most applications, so it looks like a standard. Pentax's driver gives its scanner access to the widest variety of applications—a good deal for both Pentax and scanner users.

The Pentax IQ Scan lists for $995, and a 30-sheet automatic document feeder costs $695. Owners of Pentax's previous letter-size scanner can also use the ***(continued)***

The numbers outside.



QEMM, *from page 64*
utility called Optimize, which comes with QEMM and automatically reconfigures your PC's CONFIG.SYS and AUTOEXEC.BAT files to make the most efficient use of memory. The whole process of installing QEMM and arriving at an optimal configuration takes just a few minutes.

Windows users who have been troubled by the fact that Windows robs between 10 and 70K from the below-640K area of RAM will find that QEMM solves the problem. The program can be used in place of Windows' HIMEM.SYS memory manager, letting you take advantage of its LOADHI facility to make more RAM available for character-mode DOS applications. (And for Windows applications running in real mode. Windows programs aren't subject to the 640K limit in Windows 3.0's Standard and 386 Enhanced modes, and so don't benefit from preloading memory-resident software into high RAM.)

In tests, we freed more than 100K of RAM for use by non-Windows applications in 386 Enhanced mode and over 128K of RAM in Standard mode by using QEMM 5.1 to load DOS resources and device drivers into high memory before loading Windows.

QEMM 5.1 is an ideal product for those who want to use Windows as their primary multitasking environment, because it endows Windows applications with HIMEM.SYS's management capabilities while freeing additional memory for use by DOS applications.

For those interested in the Desqview multitasking environment, the complete Desqview 386 bundle lets you load and run Windows (and Windows applications) from within Desqview in Real or Standard mode. In the former case, Windows can actually run within a Desqview window. In the latter, it must run full-screen but can access multiple megabytes of memory, just as if it were running outside Desqview.

This Windows-within-Desqview capability seems a bit hokey at first, but it has some important benefits. Chief among them is the ability to run a Windows application side-by-side with protected-mode DOS-extender applications, such as AutoCAD 386 and Lotus 1-2-3 Release 3.1. It's a viable solution for 80386 users who want to access some Windows applications without committing to full-time use of the Windows environment.

PAUL BONNER

CompuAdd's Slim 486 Fits Where It's Needed

CompuAdd is jamming its new 25MHz 486 computer into the same small-footprint box designed to hold the company's trim XT, 286 and 386SX computers. The downsized proportions and reasonable pricing position the CompuAdd 425 as the 486 for individual users.

That's good, too, because the small-profile machine (4¼ by 16½ by 15¾ inches) is unlikely to be used as a network anchor: There's room under the hood for just one 5¼-inch and two 3½-inch drive bays, and three full-length 16-bit and two half-length 8-bit expansion slots. And the cards in the 8-bit slots must jockey for space with the power supply and drive cables.

Even so, there's room enough to make one user very happy. While 1.2MB and 1.44MB floppy drives and a hard drive leave no room for a tape backup unit or a second hard disk, the trim CompuAdd motherboard contains an integrated drive electronics (IDE) disk controller, a parallel port and two serial ports, leaving four slots free after adding a video card. The system board holds as much as 8MB of 80-nanosecond RAM. While that's only a quarter of the maximum supported by many 486s, *(continued)*

The Bottom Line CompuAdd's downsized 425 offers 486 speed, slimline style and an attractive price.

COMPUADD 425, $4,995 (with 4MB RAM, 80MB hard drive, color VGA card and monitor). CompuAdd, 12303 Technology Blvd., Austin, Texas 78727; (800) 627-1967, (512) 250-1489.

WHAT'S UP!

ScanJet-emulating driver, which the company supplies for free (303-460-1600).

MOUSE TALES

Meditate on the Zen Mouse. Free your mind from all entanglements of cords and float free of base pads, because in doing so you become like the Zen Mouse (it's cordless, and its positioning wheels need no mousepad).

Be filled with inner light and power, for so is the Zen Mouse (it sends infrared signals from as far away as 4 feet to a receiver connected to a serial port, and runs for three or four days on a charge of its internal NiCad batteries).

Be compatible with those around you, and deal equally with the Left, the Right and the Center, for so does the Zen Mouse (it's a three-button device that emulates Microsoft, Logitech and Mouse Systems products and works with PCs and PS/2s).

Above all, know from whence you came, maintain a pleasing aspect so that others may speak well of you and do not consider yourself above going out among the crowds of the marketplace, for neither does the Zen Mouse (The Zen Mouse, from Zeny Computer Systems of Fremont, California, lists for $129 in its cordless version and $89 with a tail. 415-659-0386.) *Arigato.*

While we're considering strange pointing devices, let's look at Cyclops. It's not a shipping product yet, it's more of a statement of direction. But Cyclops, from San Diego–based Proxima is, well, it's a mouse on a stick. Not a pretty image, but there you are. It's a presentation pointer with a trigger-activated LED that lets you point and click to use mouse-based PC or Mac software projected on a screen. The pointer is one part of the system, and an LCD projection panel with a tiny camera attached is the other (sold separately). The camera input is mapped against the video input by the computer, and the flash of light from the pointer, read by the camera, is interpreted as a mouse click at an identifiable location on the screen. It promises ***(continued)***

The computer inside.

Since buying a computer today is such a numbers game, here's a simple rule of thumb. Look for 386™SX, 386™ or 486™ on the outside to be certain that you have Intel technology on the inside. From the company that invented the microprocessor. The company that has shipped over 10 million 32-bit processors. The same company that's investing over $1 billion this year to make sure the computer inside your computer has the technology, power and compatibility to take you into the future.

intel®

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COMPUADD 425, *from page 66*
it should be enough for anyone except OS/2 programmers.

The most outstanding characteristic of this product is its price. With 4MB RAM, either a 1.2MB or a 1.44MB floppy, an 80MB hard disk, a VGA card and color monitor, MS-DOS 4.01, PC-FullBak, Windows 3.0 and a serial mouse, the CompuAdd 425 costs $4,995. For about $400 more, you get a 1,024-by-768-pixel Seiko CM-1440 display with CompuAdd's speedy 16-bit Hi-Rez VGA card and 512K of video RAM; for about $200 more, you can boost the hard drive to 110MB. A 30-day money-back guarantee, toll-free phone support and a year of free on-site service round out the deal.

The CompuAdd 425's optional 1,024-by-768-pixel Seiko monitor sports crisp, clear images.

In our tests, the 80MB hard drive delivered quick access but a mediocre data-transfer rate, dragging the CompuAdd's performance down to the level of many 33MHz 386 machines for database work. But for processing-intensive jobs, like spreadsheet recalculations, the unit kept pace with bulkier 25MHz 486s, despite lacking the secondary cache with which many higher-cost machines supplement the 486's built-in 8K cache.

Images on the Seiko monitor were bright and sharp, though they bounced briefly when shifting between graphics modes. With its terrific speed and vivid video, the 425 is a dream machine for Windows 3.0, though CompuAdd breaks new advertising ground by including CompuAdd-logo wallpaper for Windows' desktop.

Some people might argue that the 486 chip belongs in a network server, that it's selfish to put such hot-rod power into a stylish, single-user package. But this kind of speed in this size at this price is irresistible.

ERIC GREVSTAD

An Overload of Features Makes Legacy a Letdown

Like a five-year-old child, NBI's Legacy word processor can't decide just what it wants to be. One minute it yearns to be a desktop publishing program; the next it's acting as a word processor or drawing tool. The result is an uneven program that excels in some areas while disappointing in others.

This significant revision of NBI's Legend word processor includes a licensed subset of Micrografx Designer that lets you create drawings right on the page. If you've used Designer, you'll understand the graphics mode immediately. Legacy features an icon bar like Word for Windows and a set of frame creation/manipulation tools like Ventura Publisher. The program lets you pour text into frames and manipulate their positions and attributes just like *(continued)*

The Bottom Line For a word processor, Legacy has excellent document presentation skills, but many of its basic features are difficult to grasp.

LEGACY, $495. NBI, 3450 Mitchell Lane, Boulder, Colo. 80301; (800) NBI-1111, (303) 444-5710.

WHAT'S UP!

to bring Windows 3.0 (and new worlds of weirdness) to PC-based presentations. Proxima thinks it can make the same sort of idea work using one of those battery-powered laser pointers. Sounds strange, but it could be the hottest thing in presentations since the felt-tip pen. Cyclops. Keep an eye on it (619-457-5500).

PRINTER NOISE

Mannesmann Tally's MT906 series of laser printers has won favorable reviews for its six-page-per-minute output, LaserJet emulation and compatibility with HP font cartridges. Now there's another good word: *cheaper.* The company, located in Kent, Washington, has cut the price of the line by $500. This should make the base model MT906, which now lists for $1,695 with 512K of memory, directly competitive with the HP IIP. The MT906WP, with a dual-bin sheet feeder and envelope cassette, has dropped to $2,095. And the MT906PS, with an added 2MB of RAM, a PostScript interpreter and 35 built-in Bitstream type fonts costs $2,995 (206-251-5500).

Oft-emulated Hewlett-Packard has released a new font cartridge for the LaserJet family. Called Pretty Faces, the $195 cartridge contains six bit-mapped typefaces (three of them in two sizes), including Thunderbird Extra Condensed, Signet Roundhand and the ever-popular Hobo Medium (800-752-0900).

THE KEY THING

There hasn't been a good keyboard on any notebook-size PC since the Tandy Model 100. Plus, not only are laptop keyboard layouts poorly designed, many of them won't let you connect a better keyboard. Well, an Irvine, California, company called Genovation has dedicated itself to helping those of us who suffer from the ills of notebook computer typing.

Its latest solution is the Serial Box. The Box, 5 by 4 by 1½ inches, has a keyboard connector on one end and a short serial cable lead on the other. At least every notebook has a serial port. Plug the $99.95 Serial Box into it, run a little TSR and ***(continued)***

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The 25 MHz Dell System® 425TE has up to 64 MB of RAM capacity, 11 storage bays, and a whisper-quiet 300 watt power supply. We've also built in features such as password protection, a software controlled reset switch, and an efficient cooling system to protect component life.

What's more, both the 433TE and the 425TE have the Dell designed SmartVu™ diagnostic display built in. This ingenious innovation helps identify problems even if the monitor goes down.

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- 11 internal half-height drive bays.
- Eight 32-bit EISA expansion slots (six EISA master slots and two EISA slave slots).
- High-performance IDE (80 MB, 100 MB, 190 MB) and ESDI (330 MB, 650 MB) hard disk drives.

650 MB VGA Color Plus System	433TE	425TE
Using 2 MB SIMMs	$11,799	$9,599
Using 4 MB SIMMs	$12,199	$9,999

Prices listed include 8 MB of RAM.

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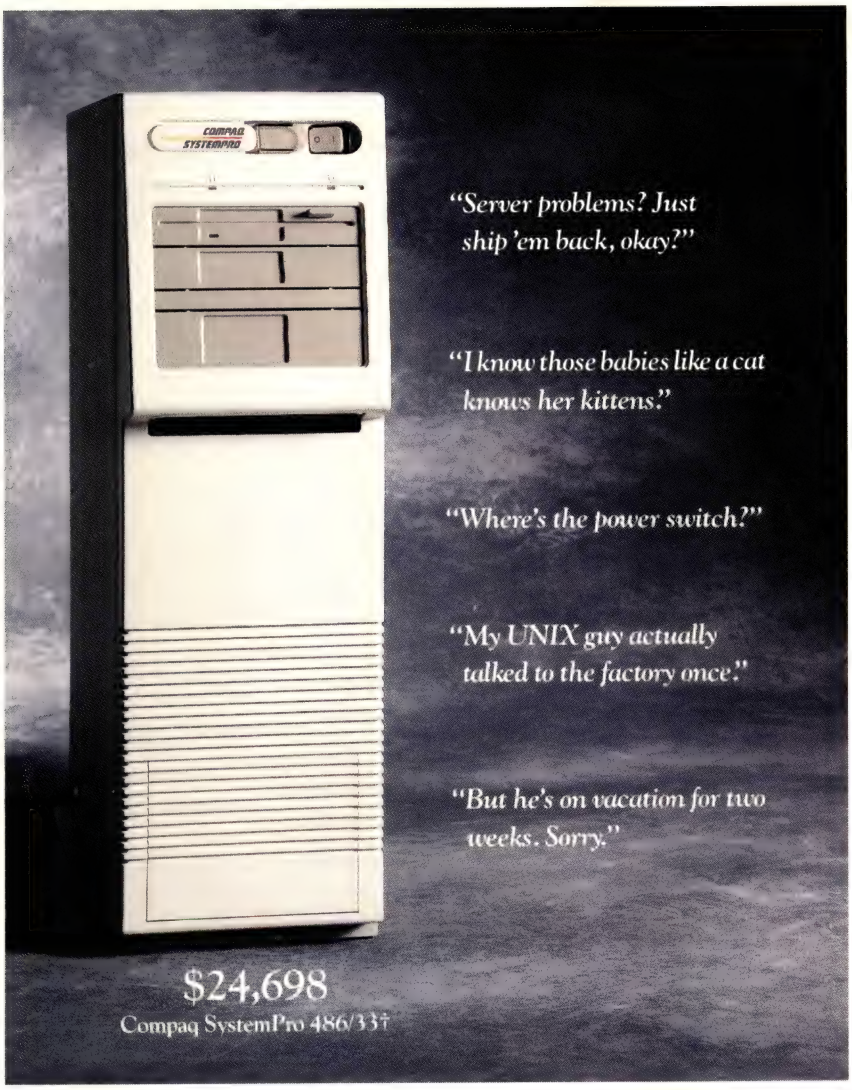
UNBELIEVABLE.



■ ***From this foundation, create a powerful PC network or UNIX workgroup.*** Dell's new systems have more than enough performance to function as a LAN Server and WAN or internetworking gateway. So they're capable of supporting the most demanding server use—a multi-function network. Of course, they're completely compatible with all major network operating systems, including Novell, 3COM and Banyan.

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That's why we have a special advanced systems hotline so you can call us direct. Dell is an AT&T UNIX source code licensee and an authorized Novell Network Reseller.

On those rare occasions we can't fix it over the phone, Xerox technicians will come to your office with the solution or part in hand.△

There's a lot more to know before you buy a server. When you call Dell, our experts will give you the help you need to buy an advanced PC or UNIX server.

Then we'll send it off with a 30-day no questions asked money back guarantee, and a one year limited warranty.

Call us.

We'd like to make believers out of you.

Above and beyond the call.

DELL COMPUTER CORPORATION

The Dell System 433TE and 425TE are Class A devices sold for use in commercial environments only. Performance enhancements: within the first megabyte of memory 384 KB is reserved for use by the system to enhance performance. All systems are photographed with optional extras. All prices and specifications are subject to change without notice. Dell cannot be responsible for errors in typography or photography. **Payment based on 36-month, open-end lease. Leasing arranged by Leasing Group, Inc. In Canada, configurations and prices may vary. DELL SYSTEM is a registered trademark, Dell and SmartVu are trademarks of Dell Computer Corporation. Dell UNIX System V.3.2 is based on INTERACTIVE Systems Corporations 386/ix.™ Intel is a registered trademark and i486 and 486 are trademarks of Intel Corporation. †From Compaq July 23, 1990 press release. UNIX is a registered trademark of AT&T in the United States and other countries. Other trademarks and trade names are used to identify the entities claiming the marks and names or their products. Dell Computer Corporation disclaims any proprietary interest in trademarks and trade names other than its own. △On-site service may not be available in certain remote locations. Shipping, handling and applicable sales tax not included in the price. For information on and a copy of Dell's 30-day Total Satisfaction Guarantee, limited warranty, and Xerox's Service Contract, please write to Dell Computer Corporation, 9505 Arboretum Boulevard, Austin, Texas 78759-7299, ATTN: Warranty. ©1990 Dell Computer Corporation. All rights reserved.

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"Overkill."

That's the kind word *PC Week* used to describe our service.

It came up when Dell™ computers won their first *PC Week* Corporate Satisfaction Poll for PCs, and our service beat the daylights out of everybody else's.

Now that we've won eight out of eight *PC Week* polls, it's even more appropriate. Because each time, our service is called vastly superior. While the service provided by

WHAT SERVICE!

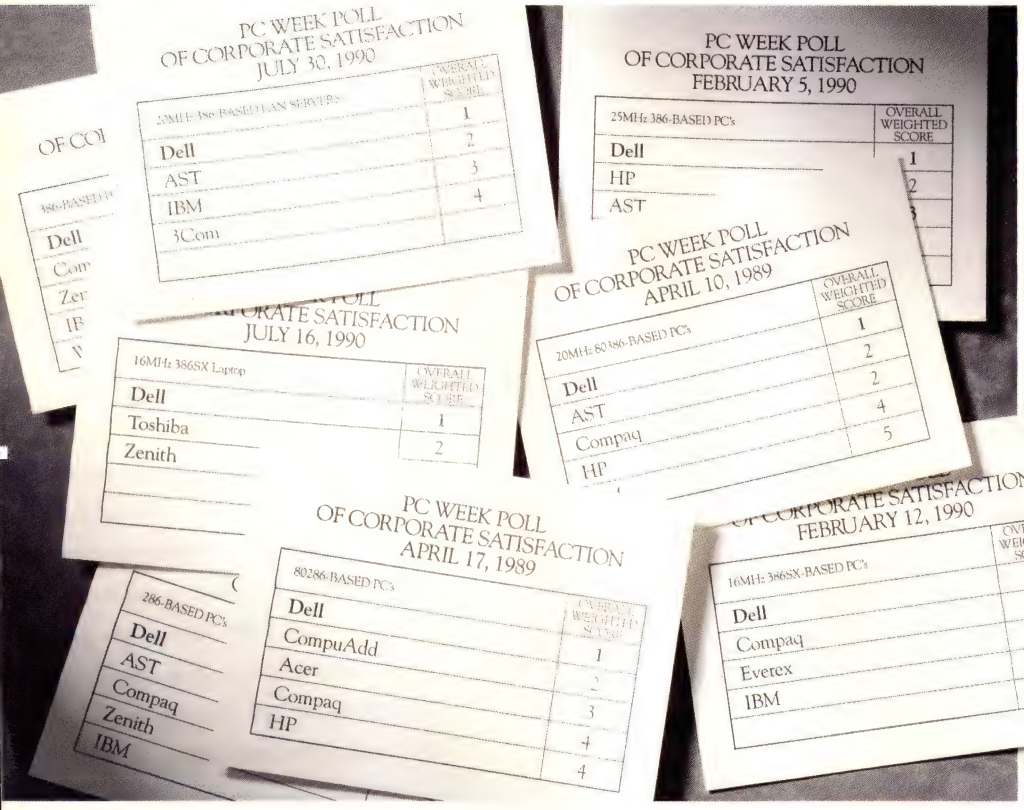
most of our competition is often called "non-existent."

Actually, one of the nice things about our service is that you'll rarely need it.

Another poll category we dominate is the one called "reliability"—due in no small measure to our testing on each machine as it goes out the door.

You shouldn't have to go through some Compaq dealer. It's better for you to talk directly to the manufacturer. So we've made it easy to call us direct. We have a staff of technical people trained at Dell who solve over 90% of the problems over the phone, generally in under 5 minutes.

And we're open when you're open. Our normal hotline hours are from 6am to 9pm Central Time, Monday through Friday. On Saturdays, from 8am to 4pm Central Time.



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First year of on-site service is included in the price of the computer.

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Toll-free technical support hotline.

Next business day deskside service.

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Dell Bulletin Board (512) 338-8528.

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But let's say your normal hours are ridiculously abnormal.

Even if you're pulling an all-nighter, you can still call the Dell technical library on our new twenty-four hour automated TechFax line. Detailed information will be faxed

WHAT SERVICE?

back to you automatically.

But our help doesn't end there.

We've introduced a Dell Bulletin Board. When you tap into it with a modem, you'll see other questions about Dell computers. Better yet, you'll see Dell's answers, which could help you learn more about your own Dell system.

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We log every call you make to us into a database. Over the course of years, we end up knowing your computer better than you do. This familiarity with your computer means better help quicker.

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We're actually there when you need us the most. It doesn't happen too often, but occasionally even our technical hotline people can't solve your problem over the phone. Then the trained technicians at Xerox will actually come to your desk the next business day, with the solution or part in hand.△

You can test our service right now. We figure the best way to sell you on our service is to show it in action. Call and talk to our technicians. If you don't have a problem, make one up. Or just chat. Get a feel about what we know, and how we handle questions, and what we can do for you.

Okay, we're going to repeat this one more time:

For PC service that's been voted the best in the business eight times, call 800-TRY-DELL (800-879-3355).

It'll give you a taste of what you've been missing.

Above and beyond the call.

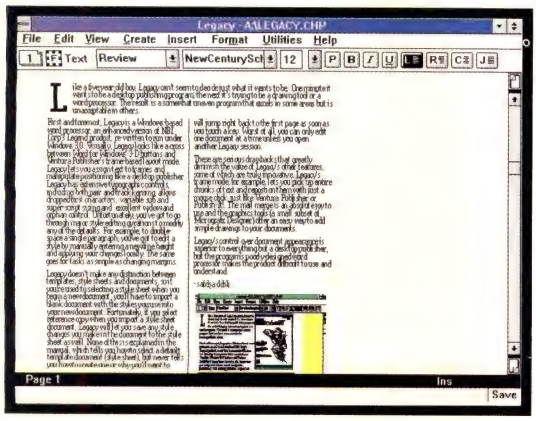
DELL COMPUTER CORPORATION

CIRCLE NO. 177 ON READER SERVICE CARD.

LEGACY, *from page 68*

a desktop publisher. It also provides extensive typographic controls, including pair and track kerning, line height adjustment in points and variable-size subscripts and superscripts.

In fact, Legacy has so many options and provides so much control over document presentation that it's a good bet for small desktop publishing jobs like newsletters, forms and brochures. Corporate users will have the best-looking memos in the firm. Legacy includes such tricks as column straddling, image rotation, dropped capitals, bullets and boxed text to give your documents a flair you just can't get from other word processors. To help you use all these features, NBI includes a book, *Designing High-Impact Documents,* which offers a comprehensive explanation of typographic terminology.



Legacy's desktop publishing capabilities allow you to create graphical elements such as an initial drop cap and a thumbnail view of a page with text and graphics.

Despite its many good points, Legacy makes you go through major style-editing gyrations in order to use many functions. To double-space a paragraph, for example, you've got to edit the style associated with that paragraph by entering a new line height (in points) and applying your changes locally. The same goes for tasks as simple as changing margins. Control of just about everything is handled by modifying a style or, if you're in frame mode, modifying a property. This wouldn't be so terrible if Legacy handled style sheets well, but it doesn't.

The program makes no distinction among templates, style sheets and documents. As a result, if you want to select a style sheet when you begin a new document, you must first set up blank style documents modified with the styles you want to use and import them into new documents. Plus, to edit a style sheet document in Legacy, you have to call up the style sheet and edit it directly. And since you can edit only one document at a time, you'll have to go back and make changes later. The good news is that when you're editing a style sheet, your changes can be reflected in documents you've already created. Unfortunately, all this is explained in the manual under "Import," rather than where you'd expect to find it, under "Styles."

Legacy also stumbles in other basic word processing tasks. The draft-mode font is a bizarre Courier with lines so tightly spaced that it's virtually impossible to read, and the cursor doesn't move when you operate the scroll bars. You can go forward four pages, but unless you click the mouse on that fifth page, the screen will jump right back to the first page as soon as you touch a key. Worst of all, you can edit only one document at a time unless you open another Legacy session.

These are serious drawbacks that greatly diminish the value of Legacy's other features, some of which are truly innovative. Legacy's frame mode, for example, lets you pick up entire chunks of text and reposition them with just a mouse click. The mail-merge function is terrific, and the graphics tools offer an easy way to supplement your documents with simple drawings.

If you can get past the program's cumbersome word processing mode, you'll discover that Legacy gives you more control over document appearance than any other product, except for a desktop publishing package. But NBI needs to improve some of Legacy's basic features if this word processor is to become a hit.

DOUG VAN KIRK

WHAT'S UP!

connect your *familiar*, comfortable, normally laid out 101-key keyboard.

Genovation has a couple of other products that tackle the same problem from other angles. The Parallel Keypad II connects a 32-key keypad to the parallel port (*it's a pass-through connector, so you can still hook up a printer*). Each key is definable, and you can even store a multikey combination to a single key. For notebooks such as the Compaq LTE, which has an OK alphanumeric layout but lousy cursor-key placement, the $139.95 Parallel Keypad works well while letting you develop a couple dozen custom function keys for your favorite applications.

The Parallel Keyboard 101 extends the idea of the Parallel Keypad II with its pass-through connector to a complete 101-key keyboard for $199.95. If you want a full keyboard, go with the Parallel Keyboard. If you've already got the keyboard and just want to connect it to your portable, choose the Serial Box (714-833-3355).

COMMENTARY

ForComment got a lot of attention a couple of years ago as one of the first software products that remotely resembled "groupware." It let a group of people share the editing of a document. That original version, distributed by Broderbund, had one great failing: To pass the document among members of a group, you had to use the sneakernet because the program didn't run on a network.

A new version—or a revival—of ForComment adds that key element. Access Technology, of Natick, Massachusetts, has poured considerable effort into porting the program to the VAX VMS and Novell NetWare platforms. It still has shortcomings as a network application, however. It doesn't read the NetWare bindery to help you build a transmittal list of user names, and it doesn't provide document management to all users, so it lumps all the ForComment documents it finds into a single list. It also can't sort them by author, due date or, for example, by whether you've looked at them. ***(continued)***

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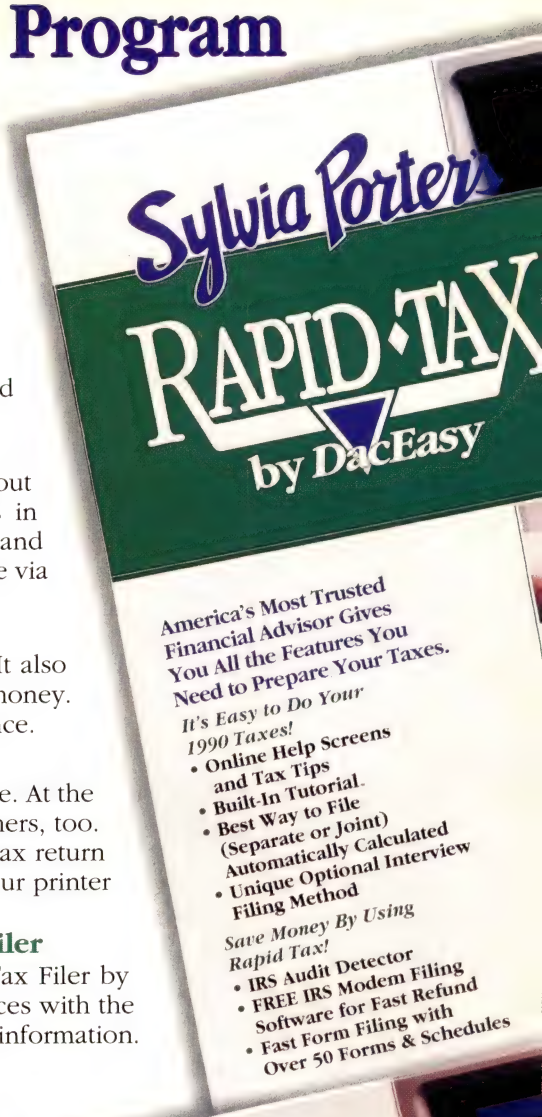
Also Available - Sylvia Porter's RapidTax Regional State Tax Filer

t's easy to file your State Taxes when you use the RapidTax Regional State Tax Filer by acEasy. Sold separately through DacEasy for only $49.95, this program interfaces with the ederal RapidTax program making state tax filing simple. Call DacEasy for more information.



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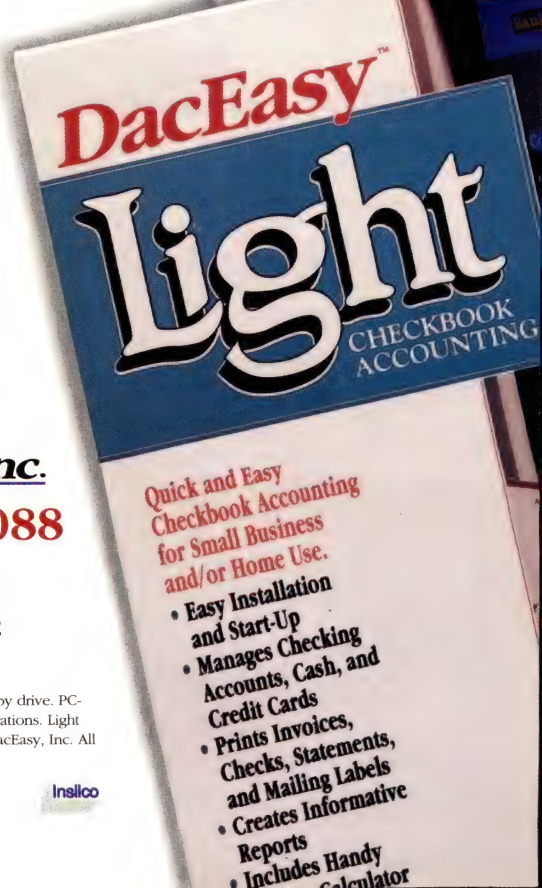


Minimum Hardware Requirements: Sylvia Porter's RapidTax requires 512K memory. IBM or compatibles. One hard drive and one floppy drive. PC-DOS or MS-DOS 2.1 or higher. 80 column printer. For use in U.S. only. IBM, PC-DOS and MS-DOS are trademarks of their respective corporations. Light nd RapidTax are trademarks of DacEasy, Inc. • 17950 Preston Rd. • Suite 800, Dallas, TX • 75252. • 1-800-877-8088 © Copyright 1990 DacEasy, Inc. All ights reserved.

SEE US AT FALL COMDEX AT THE SANDS

Insilco

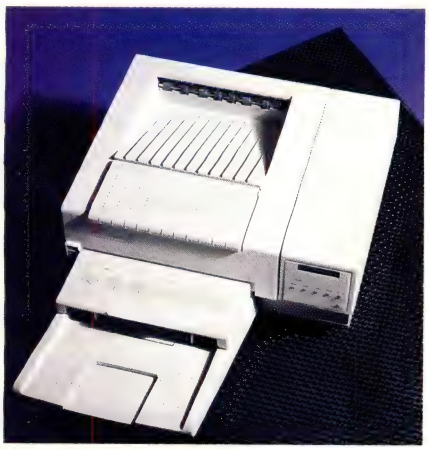
CIRCLE NO. 184 ON READER SERVICE CARD.

New!

NEC's Value-Packed Laser Prints PostScript and PCL

The $2,495 NEC Silentwriter2 Model 90 is unlikely to push the laser printer giants from Hewlett-Packard, Apple and QMS out of the limelight. But this PostScript/PCL laser's bargain price and breadth of features make it a worthy choice for anyone who wants versatility on a budget.

Unlike the HP LaserJet III, the Silentwriter2 Model 90 comes with the 35 Adobe scalable typefaces made requisite by Apple's LaserWriter series. And unlike the QMS-PS 410, the Model 90 offers the LaserJet IIP's 14 resident fonts. It also mimics the PS 410's 2MB of RAM and serial, parallel and AppleTalk ports, although the ports aren't simultaneously operational, as the PS 410's are. The Model 90's print speed, which is generated by a Minolta print engine, is rated at 6 pages per minute, placing its performance smack in the middle of the 8-ppm LaserJet III and the 4-ppm PS 410 and LaserJet IIP.



The 250-sheet paper tray of the Silentwriter2 dwarfs those of other PostScript/PCL laser printers available in this price range.

In graphics capability, the Model 90 stacks up nicely against any laser printer. Its output is very black, noticeably darker than that of the LaserJet IIP and PS 410, both of which use the same Canon print engine. It also prints most graphics several seconds faster than the LaserJet III, which tends to be slowed by graphics-intensive files. But if you need crisp display type, the Model 90 (like others, including the PS 410) lets you down. It creates jagged edges in large point sizes that the LaserJet III smooths with its built-in resolution enhancement. While this will go unnoticed by some users, it's apt to disappoint the trained eyes that create and view presentations and published materials.

Moreover, despite its ability to print dark solid areas, the Model 90's Courier output in LaserJet IIP emulation is quite faded. Another disappointment is the machine's size, about the same as the hefty LaserJet III. The LaserJet IIP and the PS 410 offer much smaller footprints.

On the plus side, however, are the Model 90's paper-handling capabilities. Its tray holds 250 sheets, far more than the PS 410's, which gives you just 50. It also accommodates legal sizes and envelopes, so there's no need for optional paper cassettes that usually cost upwards of $100 for Canon-print-engine-based lasers. The Model 90 comes with screen-font software for both PCs and Macs. But if you think that you may want to add PCL font cartridges someday, consider another printer. NEC doesn't offer any cartridge slots. It claims users just don't want font cartridges, and with Windows and PostScript, they may be right.

What most of us want in a laser is a relatively fast, ready-to-go PostScript/PCL-compatible printer at the lowest price around. With a few minor caveats, the Silentwriter2 Model 90 provides just that. Add to the mix some impressive paper handling, and you've got a very good value and a printer that offers extraordinary flexibility.

PEGGY WALLACE

The Bottom Line The NEC Silentwriter2 Model 90 is the lowest-priced PostScript/PCL-compatible laser printer around.

NEC SILENTWRITER2 MODEL 90, $2,495. NEC Technologies, 1414 Massachusetts Ave., Boxborough, Mass. 01719; (800) NEC-INFO, (508) 264-8000.

WHAT'S UP!

But the basic idea is still a very good one. You can collect comments and editorial changes to a document and swap the changes in and out of the original text. ForComment keeps track of the source of each suggested change and exactly where it goes in the original text (508-655-9191).

THERE'S A NAME FOR IT

If you use a laundry marker to write your name on your socks, you're merely compulsive. If you label them "L" and "R," AMT Communications has a product for you. The Torrance, California, company's Label Logic is a collection of 144 sticky labels that say things like "Mouse" and "Monitor" and "Slot 6" and "Drive B."

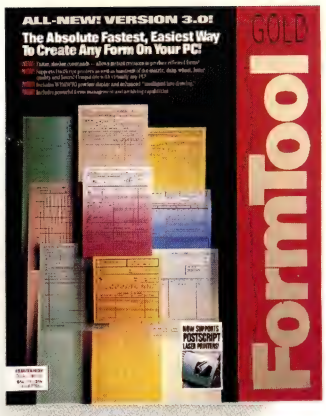
Like on Noah's Ark, there's two of everything, and you will stick one "Printer 1" label on the parallel port on the back of your PC, and the other on the cable end that leads to the printer—except, of course, that you get only one of some labels and you're supposed to stick those to the "EZ Reference Card" that comes with the labels, creating a record of your system configuration—which you'd better not want to change, because the stickers use a high-quality, semi-permanent adhesive.

The EZ Reference Card also includes spaces (but no stickers) for recording useful setup information, like if a keyboard is installed. If you've been frustrated by the lack of a neat, semi-permanent label for Port 3F8H, Label Logic, for $6.95, is just the ticket. For a good time, call (213) 320-7757.

NEW AND RENEWED

ToolBook at last has some competition: PLUS 2.0 for Windows is shipping from Spinnaker of Cambridge, Massachusetts. This is the second version of PLUS (the Mac version was out last summer and the OS/2 version is expected momentarily). Spinnaker describes PLUS as a "hyperprogramming applications development environment," which means it's something like HyperCard for Windows. In fact, the Mac version of PLUS will convert HyperCard stacks to PLUS stacks, and PLUS for Windows will run the *(continued)*

NEW! FORMTOOL GOLD!
Just Sit Down and Create a Great Form!
The Best-Selling Forms Software In the World!



It's easy to see why FormTool is the best-selling forms package in the world. It's the fastest, easiest way to create, edit, manage and print custom, professional forms for immediate information gathering.

The ability to quickly gather data and put it to work is critical to corporate information flow. FormTool's "Intelligent Line Drawing" and its hardware compatibility make it an indispensable tool for businesses of any size. That's why FormTool has found a home in well over half of the Fortune 500 companies, along with thousands of educational institutions, government agencies, hospitals and financial organizations around the world. They've discovered FormTool's productivity and information gathering power.

Unlike its competitors, FormTool doesn't require additional memory, a graphics card, color display, mouse or scanner. It runs beautifully on anything from an XT to a 486. FormTool now supports hundreds of dot-matrix, letter-quality, daisywheel, thermal as well as Hewlett-Packard printers, and new support for PostScript lasers.

Draw Forms with Unmatched Speed.

FormTool streamlines the PC's ability to draw forms. Lines of any weight, boxes of any size, grids of any complexity and more can be quickly drawn with just a few keystrokes. If a grid isn't quite right, one keystroke re-draws it to meet your exact specifications, then displays it on the screen with our WYSIWYG display. Zoom in to see a close-up of your form, then zoom out for the full page view. If you spot a problem, quickly make the revision, preview it again — then print it.

This preview capability combines the advantages of a graphics-based, on-screen display with text-based, lightning-fast processing times and makes FormTool even easier to use — and enhances creativity and accuracy in the design process.

FormTool's ability to make instant revisions to your forms gives you the flexibility to create exactly the proper form to meet the precise requirements of your work flow. And FormTool is so simple to use, it's ideal for users of any experience level right out of the box.

No other forms package delivers the productive drawing power of FormTool.

Enter Text into Your Forms in Seconds.

To handle text, FormTool contains a forms-oriented word processor that allows you to move quickly through the form inserting captions, instructions, word-wrapped text and special symbols, logos and characters. FormTool will enter your text into position automatically.

An All New Forms Manager.

And FormTool Gold contains an all new Forms Manager that makes organizing, retrieving and archiving forms faster and more efficient. Includes a built-in backup and restore, the ability to instantly view forms from a list on your screen and a new set of features that allow you to "move," "copy," or "delete" forms from the Forms Manager.

FormTool's Forms Manager also includes hard disk directory support, allowing you to store forms anywhere — or you can assemble form sets in just seconds using the sleek new menu system. There's an all-new automatic "Backup and Restore," a new "View Form" feature — even an innovative directory system for fast, efficient archival.

All New PostScript Support.

FormTool now allows you to quickly print your forms on PostScript and compatible laser printers without conversion or special commands. Simply select your printer type from the configuration screen and print. You can add logos, graphics and other elements to your forms.

Display Multiple Forms in Windows!

FormTool will allow you to load up to four forms into your computer's memory for quick toggling between them, or for viewing multiple forms on the screen at one time.

While editing multiple forms, elements can be transferred from form to form. Blocks can be easily copied, replaced, moved between forms.

Form Fill-In and Merge.

FormTool's merge capability allows users to fill-in form templates, save the data, and print it out into position on the form. This data can be saved by FormTool's database for later retrieval, editing and re-printing.

NEW! FORMTOOL GOLD

JY 1020 **FormTool 3.0** 5¼″ & 3½″ **$79.00**

IBM PC, XT, AT, PS/2 or compatibles with 265K. Floppy or hard disk, supports all color or monochrome monitors with or without graphics cards and virtually all dot-matrix printers, daisywheel and laser printer.

Anatomy of a FormTool Form

Horizontal And Vertical Line Drawing.
All you have to do is position the cursor where you want to draw a line. Then hit one key, and FormTool will automatically draw the line.

Any Type Style.
Choose from italic, underlined, bold, bold italic, superscript, subscript and user defined styles.

Large Letters.
You can select large letters, and even oversize letters up to one inch tall.

Line Width.
Just specify single, double, or bold lines, and FormTool will draw them. You can also switch between single, double and bold lines with one keystroke.

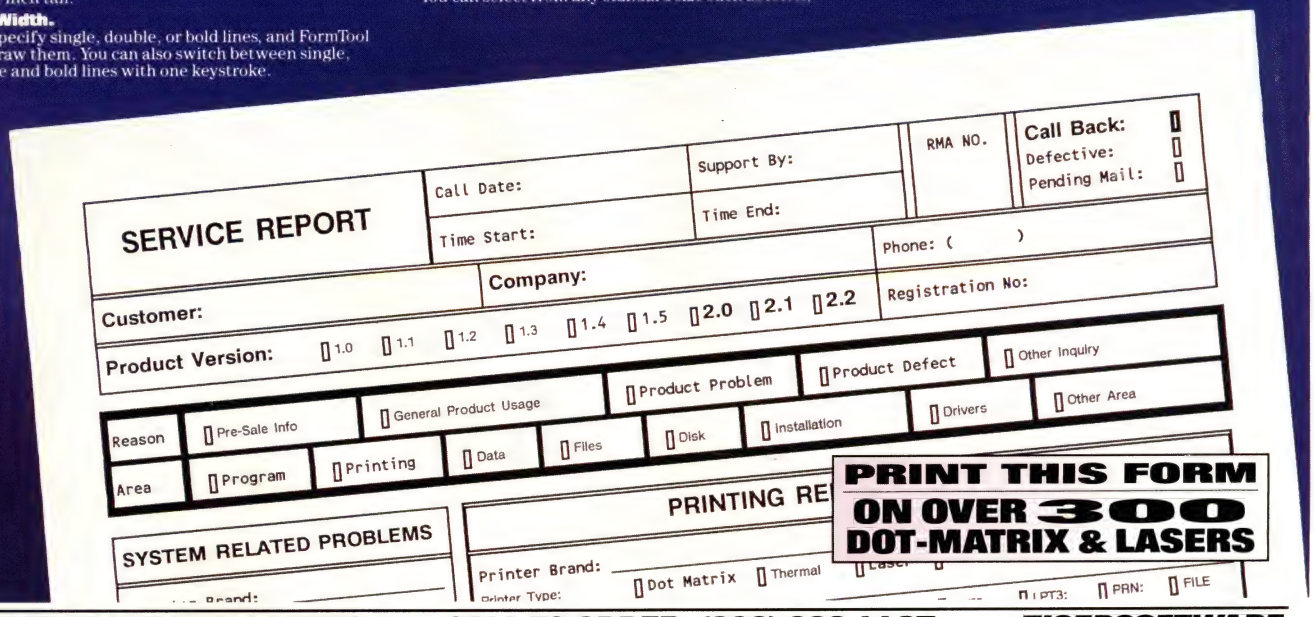
Form Fill-In & Merge.
You can easily set this form up as a template for filling in — to be printed, or stored.

Automatic Grid Drawing.
Drawing a grid is easy — just specify: column width, row height, number of columns, number of rows, or leave any out, and FormTool will automatically draw the grid based on your specifications.

Form Size.
You can select from any standard size such as letter, legal, or computer. Or, you can specify a custom size from postage stamp to 13½ inches.

Perfect Corners.
FormTool will end every line with perfect corners and T's — everytime. It will even "pipe" double lines.

Fully Supports All Attributes of Your Printer.
You can "plug in and print" over 300 dot-matrix, ink jet, thermal, letter quality and laser printers.



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TIGERSOFTWARE

CIRCLE NO. 117 ON READER SERVICE CARD.

New!

Basic-16: Standard VGA At a Stand-Out Price

It's almost too good a deal. ATI's VGABasic-16 card is a rock-solid performer selling at a rock-bottom price: $99. That's a crisp $200 lower than ATI's best-seller, the VGAWonder Plus, the price/performance leader among VGA boards. The list price is also about the same as the lowest street prices for "no-name" cards.

How does ATI do it? The company has wrung every non-essential item from the low-cost board. The stripped-down Basic-16 doesn't provide Super VGA high-resolution modes, goosed-up flicker-free refresh rates or any bells and whistles—nothing but speed, compatibility and easy setup.

Even the board's size has been drastically pared. It measures a mere 2¾ inches high by 6¼ inches long, so it's about the size of a couple of credit cards laid end to end. ATI cuts the board to size with a proprietary surface-mounted ASIC VGA chip, which integrates the functions of several chips found on other VGA cards. (ATI uses the same chip on the VGAWonder Plus.) The seven silicon chips on the Basic-16 represent about one-third to one-half the number of chips populating other VGA cards. The reduced chip count also helps to lower the price.

With just seven chips, the stripped-down VGABasic-16 is smaller—and cheaper—than its competitors.

There are no discernible design compromises on the Basic-16. It's limited to VGA only, but it provides full 640-by-480-pixel resolution in 16 colors with perfect VGA compatibility. Plus, it does everything that came before VGA: EGA, CGA, Hercules, MDA. The Basic-16 is a 16-bit board, and a device driver is included that loads the video BIOS into system RAM, where it executes faster than it would from the card's ROM

The diminutive video board is easy to install, in part because it's configured via software and has no jumpers or dip switches. It also has a proprietary technique that automatically checks for incompatibilities and conflicts over memory addresses, to which other VGA cards are prone. For example, we tested the board in a 386 system with an image scanner installed. It coexisted with the scanner nicely, while another 16-bit VGA card had to be reset to 8-bit operation before the scanner would work.

The 16-bit operation, along with 256K of onboard video RAM that works in page mode and RAM shadowing of the video BIOS, make the Basic-16 do well on benchmark tests. But in use, it was impossible to tell whether the Basic-16 was faster or slower than other VGA cards. It's safe to say, though, that the Basic-16 won't be any more likely to cause a video bottleneck on your system than more expensive VGA cards will.

Clearly, the Basic-16 isn't a graphics card intended for CAD workstations. It's an economical solution for desktop PC users who want to upgrade to VGA for graphical interfaces. It's also the perfect solution for gray-scale VGA monitors, for which a $300 card seems a bit of overkill. At $99 list, and with the performance and compatibility of much more expensive cards, this is going to be a very popular VGA card. **DAVID DEJEAN**

The Bottom Line Price, performance and compatibility make ATI's VGABasic-16 a painless path to VGA.

VGABASIC-16, $99. ATI Technologies, 3761 Victoria Park Ave., Scarborough, Ontario, Canada M1W 3S2; (416) 756-0718.

WHAT'S UP!

converted stacks (617-494-1200).

Clipper Version 5.0 from the Nantucket Corporation of Los Angeles is out at last and apparently worth the wait. It makes Clipper much more than a dBASE compiler, say developers who've been working with it; it's now a development language that rivals C. Clipper 5.0 includes a new compiler, linker and debugger, adds support for several SQL servers and includes virtual memory management, so it can run really big applications under DOS. It lists for $795. Registered users of previous versions can upgrade for $195 plus shipping charges (213-390-7923).

Symantec AntiVirus for Macintosh (SAM) has been a long-running hit, and Symantec, of Cupertino, California, has turned its virus knowledge to the PC under the banner of Norton AntiVirus. Like SAM, Norton AntiVirus scans files coming into the PC for viruses and checks each application run and the files it attempts to load into memory. A diagnosis and reporting module scans all drives for known viruses and issues a report of its results. The new product sells for $129.95 (800-343-4714, Ext. 700).

Version 5.0 of AskSam, the text-oriented database manager, adds new commands that improve text processing and add relational database capabilities. A "free mode" finally ends the program's 20-line limit on records, and a "controlled field" editor allows the creation of fixed-length fields. Best of all, AskSam gets a new set of manuals, which promise to help users learn the features of this very interesting program, rather than keep them a secret as did the documentation of previous versions. AskSam Systems of Perry, Florida, is also releasing a Developer's Edition, which adds tools including more global variables, the ability to lock application code away from users and a licensable runtime version (800-327-5726).

The first question about the BlueMax memory manager for 386 IBM PS/2s is, "Is this product really necessary?" Isn't a 386 a 386? No, says Mary Stanley, *(continued)*

LIKE A BOLT FROM THE BLUE,

your hard disk will eventually come crashing down. Manufacturers expect it. They even give hard disks an "MTBF" rating – the Mean Time Between Failures.

Before you lose your valuable data, back it up with Fastback Plus.

BACKUPS IN A FLASH With Fastback Plus, you can do things that DOS Backup never dreamed of. Like back up all your daily file changes in less than a minute. Or blaze through your entire hard disk at three megabytes a minute on 386 machines, or 10 megabytes in four minutes on an AT. It even formats your backup diskettes – automatically.

STRIKING SIMPLICITY Fastback Plus has three user levels – beginner, intermediate and advanced. Simple menus tell you how long your backup will take, and how many diskettes you'll need. And a unique data compression feature cuts the number of diskettes you need in half. You can even automate the entire process with one-touch macros.

DAZZLING SAFETY Only Fastback plus gives you reliable Advanced Error Correction. To illustrate, we punched a hole larger than a .22 calibre slug right through a backup diskette – and retrieved all the data! That's security. And if you need help dodging even bigger bullets, our technical support staff will surprise you with its courtesy and ingenuity. Just call, and you're guaranteed same-day service.

GLOWING REVIEWS *PC Magazine* said it best in giving Fastback Plus its prestigious 1989 Editor's Choice Award: "Fastback Plus has virtually everything a backup program needs: top-speed performance, clear menus, every imaginable option, even a built-in macro program for automating complex tasks. A superb achievement."

A POWERFUL GUARANTEE Use Fastback Plus for 30 days, and if you're not completely satisfied, return it for a full refund. You have nothing to lose. And everything to save.

FREE PYRO For a limited time, get a FREE copy of Pyro!™, our popular screen-saving program just for writing "Pyro" on the Fastback Plus registration card before you return it. That's a $49.95 value – free!

Call now for complete details and the dealer nearest you.

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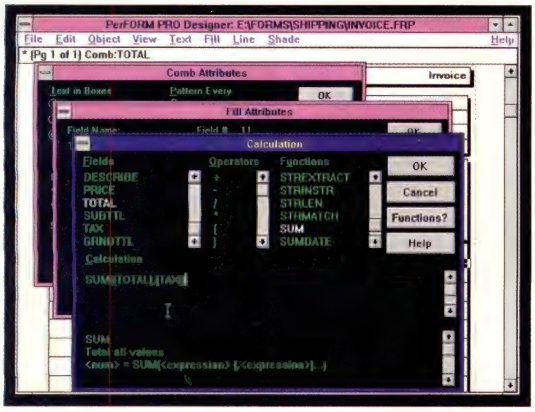
CIRCLE NO. 152 ON READER SERVICE CARD.

New!

PerForm for Windows Steps Out in Fine Form

The most powerful and easy-to-use forms-creation and fill-in package just got better. Called PerForm Pro, Delrina Technology's Windows 3.0 version of its GEM-based PerForm has professional features to match its name.

Historically, the $295 PerForm has been the best value for users who wanted existing databases printed on forms. The $495 Windows 2.x-based JetForm carved out a niche partly on its speedy printing. PerForm Pro costs $495, too, but its new features preserve its value-leader status. (PerForm 2.0 users can upgrade to PerForm Pro for $119.)



PerForm Pro's SUM feature is one of 65 advanced mathematical and logical functions in the update.

On the design side, PerForm Pro offers more than 100 sample forms, about three times as many as its predecessor (JetForm offers fewer than 10). Sample forms range from credit applications and invoices to personnel appraisal forms and expense reports. If you're not a designer, it's easier to modify an existing form than to create one from scratch.

PerForm Pro lets you design forms with security features that prevent unauthorized individuals from reading or changing data in certain fields. If you maintain personnel files that include employee addresses and salary information, for example, you can design forms that let an assistant read and update the address field without being able to read the salary field.

You can also create fields that accept electronic signatures. If you have a loan application that must be approved by several managers, you can specify that certain fields be accessed only by those managers. If a field is empty, you know which manager has not approved the form.

On the fill-in side, PerForm Pro offers 65 advanced mathematical and logical functions that do everything from figuring the number of days between two dates to calculating present and future values of an annuity. The original PerForm didn't offer any of these functions; JetForm provides 45.

PerForm Pro also writes directly to dBASE files. JetForm and earlier versions of PerForm require you to enter several commands to export data to a database.

PerForm products have a reputation for slow printing speeds. Not anymore—the program now offers three print-speed modes. Using the middle speed, we printed a simple form and elicited comparable printing times from PerForm Pro and JetForm. This faster setting ignores some fancy design touches. For more complex forms, you must set the program at "regular," which is still slow. The highest setting is very fast but strips out all but the bare bones of your form, so it's really a preview feature.

When your forms are created, even those who don't use Windows can fill in PerForm Pro forms with the $199 GEM fill-in module. All in all, PerForm Pro is a strong upgrade that leads the forms-creation pack.

RANDY ROSS

The Bottom Line PerForm Pro for Windows 3.0 is the best all-around forms-creation and fill-in package.

PERFORM PRO, $495. Delrina Technology, 1945 Leslie St., Don Mills, Toronto, Ontario, Canada M3B 2M3; (416) 441-3676.

WHAT'S UP!

First Lady of memory management and CEO of Bethesda, Maryland-based Qualitas, maker of the well-known 386Max memory manager. The PS/2 BIOS includes routines specific to OS/2 and meaningless to DOS, she says. BlueMax squeezes them out, and the BIOS compression frees 72 to 88K of RAM above 640K on a 1MB PS/2 for loading utilities, drivers and TSRs. BlueMax offers all the features of 386Max 5.0 for $155. Users of 5.0 can upgrade for $25 (301-907-6700).

Crosstalk Communicator from DCA of Alpharetta, Georgia, is a $99 telecommunications package that serves two purposes. It's an easy-to-use communications package (it includes diagnostics that relieve the user from having to enter much set-up information) and it records keystrokes into scripts compatible with the Crosstalk Applications Script Language (CASL) used by DCA's flagship package, Crosstalk Mk. 4. And because it's compatible with CASL, Communicator is an inexpensive platform for running sophisticated CASL scripts developed using the Mk. 4 package (800-241-4762).

MEA CULPA, ADOBE

I messed up, and none other than Jim Seymour straightened me out: In the October What's Up!, I wrote that Adobe's PostScript cartridge for the Hewlett-Packard LaserJet Series II didn't include type fonts but came with 35 soft fonts to be downloaded to the printer. Seymour (the same guy who's been on the wrong end of so many debates with John Dvorak a few pages to the left) gently told me what an idiot I'd been for screwing up something so simple. Seymour was right—Adobe's $495 LaserJet II cartridge includes the entire 35 type fonts in the classic LaserWriter Plus set built right in. This has been a very unsettling experience for me. Not because I was wrong (I've been wrong once, maybe twice before), but because Seymour was right. It raises the distinct possibility that he could have been right in some of those debates, and Dvorak could have been...No, I won't even think it.

Now that you get the basics, here's why you should get the most popular backup software available.

LIKE A BOLT FROM THE BLUE,

your hard disk will eventually come crashing down. Manufacturers expect it. They even give hard disks an "MTBF" rating – the Mean Time Between Failures.

Before you lose your valuable data, back it up with Fastback Plus.

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CIRCLE NO. 175 ON READER SERVICE CARD.

If You Want In A 386 System, Do

Selecting a new computer system can be a real challenge. That's where we come in. We have the knowledge and experience to make your job easy. So, just do the Standard thing. Pick up the phone and check us out. Test us. Talk to us about our quality. Our service. And especially our prices. You'll like what you hear.

Introducing Features, Flexibility and Fantastic Color.

Then ask us about our new 386/25 and 386/33 systems. The list of standard features includes the latest that high technology has to offer. Features like a 64 KB memory cache for the 386/25, and 128 KB for the 386/33, both expandable to 256 KB, providing the fastest possible memory access. Then there's the integrated VGA controller supporting 1024 x 768 resolution, with 256 vibrant colors and a 50% performance increase all made possible by 1 MB of 32-bit video memory. Plus support for interlaced and non-interlaced monitors. When it comes to features, we set the standard.

No one can beat our flexibility either. An integrated floppy controller and hard disk interface that support up to three floppy drives and two hard drives. Up to 16 MB of RAM on board using the new industry standard 32-bit memory modules leave all six expansion slots available. Our small footprint chassis includes both 5.25" and 3.5" floppy drives and 1 parallel and 2 serial ports. And consider this feature, our new 386/25 and 386/33 systems come standard with 5 drive bays to hold up to one additional floppy drive or tape backup and 2 hard drives. So, we can help you add on and update to your heart's content.

Our research and development center is always striving for excellence. Since 1984 we've been designing our own products, and all of our system boards are manufactured right here in the U.S. When building our computers we utilize the latest surface mount and VLSI technology for the ultimate in product reliability and space saving design. Our performance and quality are simply the standard for our competitors to beat.

We are committed to providing you with a complete system that is ready to use the minute you open the carton. Everything is loaded, tested, burned in, and ready to go. And, in order to help you easily handle the new multi-tasking

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- ☐ 100MB IDE hard drive with Cache buffer
- ☐ 1.2MB 5.25" & 1.44MB 3.5" floppy drives
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- ☐ 101-key enhanced keyboard
- ☐ MS DOS 4.01
- ☐ Microsoft Windows 3.0
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386▼33 This powerful system has Cache memory upgraded to 128K in addition to the features listed above for only $2995.00.

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- ☐ 2MB RAM (Expandable to 8MB on board)
- ☐ High performance 1024 x 768 VGA with 256 colors including 1MB of video memory
- ☐ Super Hi-Res 14" VGA color monitor with tilt/swivel base
- ☐ 1:1 interleave Floppy/Hard Disk Controller
- ☐ 40MB 28ms Hard Disk Drive
- ☐ 1.2MB 5.25" & 1.44MB 3.5" floppy drives
- ☐ 1 parallel, 2 serial and 1 game port
- ☐ 101-key enhanced keyboard
- ☐ MS DOS 4.01
- ☐ 386SX includes Windows 3.0 and mouse

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We work hard to make it easy for you to own and use our products. That also includes offering many convenient ways to purchase or lease a Standard system. Our corporate leasing programs are designed to fit your business needs. Qualified company purchase orders, personal checks and most major credit cards are also accepted.

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STANDARD
COMPUTER

CIRCLE NO. 248 ON READER SERVICE CARD.

THE MOST VALUABLE

We honor 19 new products that push the envelope of what PCs—and those who use them—can achieve.

At the Academy Awards, attention focuses on *opening* the envelope. But when Most Valuable Product Awards time rolls around at *PC/Computing*, we're more interested in *pushing* the envelope.

We honor MVPs because great products are the engine that powers the unending expansion of PCs in our businesses and lives. Innovative and powerful new products push the envelope of what microcomputers—and those who master them—can achieve.

That's why, each year, *PC/Computing*'s editors convene to study, nominate, test, discuss, occasionally argue over and finally elect those products we think represent the best that microcomputing had to offer over the past 12 months.

How did we determine that the 19 MVPs profiled on the following pages were the best of 1990? Eight principles guided our deliberations:

The MVP product solves problems that PCs haven't solved before, or solves old problems in fresh, insightful ways.

It extends a recognized PC solution to new audiences through lower price, greater convenience or smaller size.

It breaks a technical threshold.

It adds substance to a vital idea, allowing us to see for the first time the form that new concepts will take in our PC lives.

It combines technologies in surprising, delightful ways.

It offers a glimmer of the future.

It blends power, function and style.

It rewards the user by saving time, easing effort, creating wealth, enhancing skills or providing a memorable human experience.

Here are the products that we think best exemplify those ideals.

We proudly present *PC/Computing*'s Most Valuable Products of 1990.

PRODUCTS OF THE YEAR

PHOTOGRAPHS BY DANA SIGALL

TRAVELMATE 3000
TEXAS INSTRUMENTS INC.
(INFORMATION TECHNOLOGY GROUP)
P.O. BOX 202230, ITG-065
AUSTIN, TEXAS 78720
(800) 527-3500

TRAVELMATE 3000

Smaller, faster, lighter—you can be sure these three words will describe other notebook PCs to come. But no notebook upped the ante this year as significantly as Texas Instruments' TravelMate 3000.

First TI and Sharp made compact, lightweight notebook computing a reality with the essentially similar, 80C286-based TI TravelMate 2000 and Sharp PC-6220, which weigh a feathery 4.4 pounds. Then TI created the TravelMate 3000 with a 20MHz 80386SX processor, 2MB of RAM and a 3½-inch, 1.44MB floppy drive, making it powerful enough to run Windows comfortably.

Not until you hold this computer in your hands do you begin to understand what sets it apart from the pack. Fully loaded with a 20MB hard disk (a 40MB drive is optional) and a NiCad battery, it weighs 5.7 pounds. Then consider the dimensions: The TI's basic footprint is 8½ by 11 inches, and it's less than 2 inches thick. The term "notebook" was coined for heft and dimensions like these.

Other features are intriguing, too. The TravelMate offers an impressive sidelit triple-supertwist LCD VGA display with 32 gray scales. At 8 by 6 inches, the screen is among the largest of any notebook on the market. Instead of the various shades of blue found on other notebooks, there's an eye-saving black-on-white display.

About the only drawback to the TravelMate 3000 is its $5,500 price tag. Even so, the 3000 is the definition of the shape and size of notebook computing. In those circles, it's a tough act to follow.

THE TYPIST
CAERE CORP.
100 COOPER COURT
LOS GATOS, CALIF. 95030
(408) 395-7000

THE TYPIST

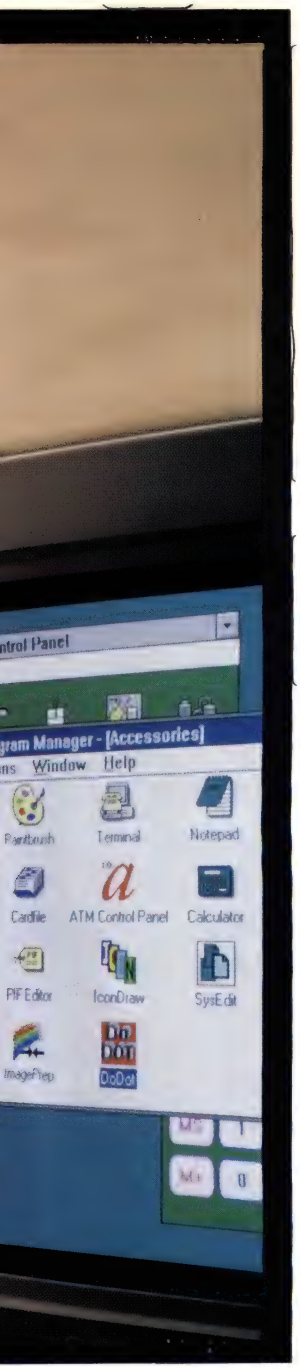
For a long time, optical character recognition—teaching a computer to read—was comparable to teaching a pig to sing: It required a great deal of effort, it often failed to produce satisfactory results, and it annoyed the pig. While OCR has improved of late, thanks to the skill of software writers and the increased computing power of PCs, it hasn't been easy until The Typist from the Caere Corporation.

The $595 Typist is a combination of three ingredients. The racy-looking black hand scanner is well designed and more stable than similar devices. Second, the OCR software derives from Caere's OmniPage products, which are among the best OCR programs for the PC and the Mac. (The software is "omnifont," which means it can recognize text in a variety of type styles and sizes.) The third—and most important—ingredient is good old-fashioned ingenuity: Because hand scanners capture an image from only part of a standard 8½-by-11-inch page, The Typist's software automatically stitches together multiple partial images to make a whole.

Caere has also added value by integrating OCR into other applications: When you come to the place in a word-processing document or a spreadsheet where you want to insert text from a printed document, you pop up The Typist's TSR software and scan the document. The Typist feeds the recognized text into the underlying application through the keyboard buffer. The software also captures graphics.

Thanks to The Typist, we can use OCR the way it should be used—as a handy tool for feeding text directly into applications.

WINDOWS 3.0 • MICROSOFT CORP. • ONE MICROSOFT WAY • REDMOND, WASH. 98052 • (800) 426-9400 • (206) 882-8080



WINDOWS 3.0

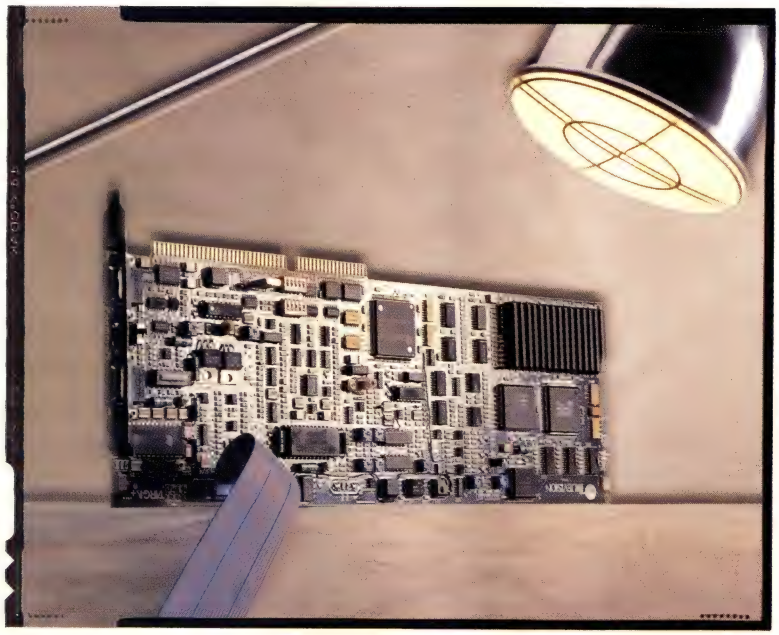
When the annals of the PC age are written, May 22, 1990, will mark the first day of the second era of IBM-compatible PCs. On that day, Microsoft released Windows 3.0. And on that day, the IBM-compatible PC, a machine hobbled by an outmoded, character-based operating system and seventies-style programs, was transformed into a computer that could soar in a decade of multitasking graphical operating environments and powerful new applications.

Windows 3.0 gets right what its predecessors—VisiOn, GEM, earlier versions of Windows and OS/2 Presentation Manager—got wrong. It delivers adequate performance, it accommodates existing DOS applications, and it makes you believe that it belongs on a PC.

Clearly, Windows 3.0 isn't perfect. It can be criticized for its dependence on DOS, its not-inconsiderable hardware requirements and the inconsistency of its interface. Nevertheless, this $149 program is the most successful attempt yet to provide a multitasking, graphical environment for the PC.

Realistically, it's good enough to work with today, while convincing us that it will only get better. And it's good enough to let application developers strut their stuff in such programs as Word for Windows, Amí Professional, Excel, Super-Base, ToolBook, Designer, Corel Draw, PowerPoint and Charisma—programs so powerful, so easy to use and so compatible that, in comparison, their character-based competitors look like last year's joke.

With Windows 3.0, the PC has taken its first sure steps toward the future. Now there can be no turning back. In the long run, the future may belong to Presentation Manager or Motif or NextStep, or to some environment that we haven't even *heard* of yet. But the success of Windows 3.0 has ensured that, whichever environment ultimately prevails, it will be multitasking and graphical.



TARGA PLUS
TRUEVISION
7340 SHADELAND STATION
INDIANAPOLIS, IND. 46256
(800) 858-TRUE
(317) 841-0332

TARGA PLUS

Truevision defined the high end of PC video five years ago with the release of Targa, a $4,995 proprietary video card that put enough color, depth and precision into a PC graphic for it to merit the label "art." This year, Truevision redefined that realm with the new Targa Plus, a much enhanced, much less expensive board (prices start at $1,795) that puts the ability to produce studio-quality video presentations right at your fingertips.

Where Targa's strength was its ability to produce colorful photo-realistic still images and color separations for desktop publishers, Targa Plus allows you to create studio-quality video productions that incorporate images and animations created with standard VGA graphics software.

No longer is Targa a design-shop-only solution—the card is available to all PC users. Its VGA pass-through feature lets you run your VGA applications from the same video system you use to enhance those four-color illustrations in the company's annual report.

With the Targa Plus chroma-keyer, you can bring in a live video feed and display it on a PC monitor with special-effects graphics you've created and stored on your PC. You can also capture the video frame by frame, enhance and manipulate the frames using your Targa applications and blend the results with a graph created in Freelance Plus or an animation you produced in AutoDesk Animator.

With its new features and new price, Targa moves into the mainstream of PC video and redefines our expectations of PC graphics.

LASERJET III
HEWLETT-PACKARD CO.
19310 PRUNERIDGE AVE.
CUPERTINO, CALIF. 95014
(800) 752-0900

LASERJET III

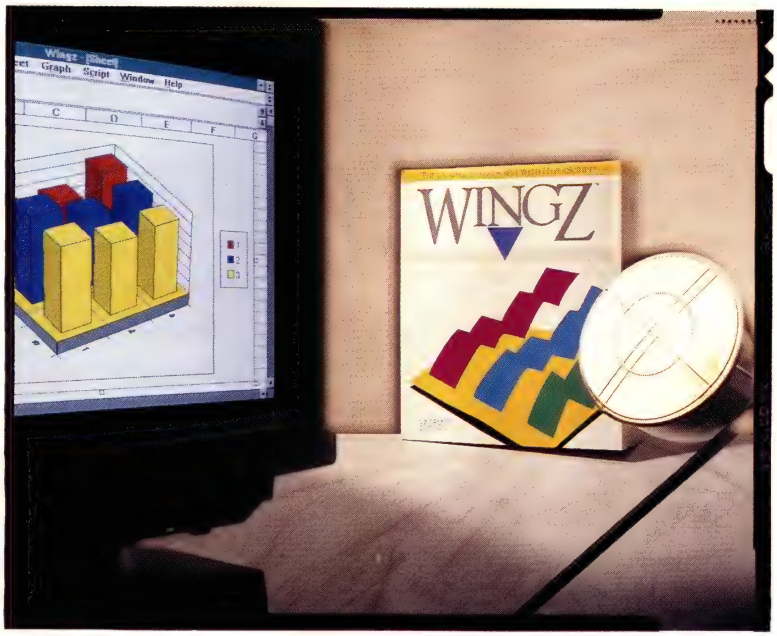
Can it be that other laser printers even existed before the Hewlett-Packard LaserJet III? Not even a year old, this $2,395 printer has already become the yardstick against which every non-PostScript laser printer is measured. And though the price-cutting and feature enhancements it has spurred among the competition are a consumer's dream, you just can't go wrong by following this leader.

Quite simply, this is a terrific package for a terrific price. With HP's latest printer language, PCL 5, the LaserJet III breaks new ground in non-PostScript output. You can scale the eight resident typeface outlines on the fly to any size you like. You can place text and graphics on the page with impunity. Making it all razor-sharp is the LaserJet III's chip-level Resolution Enhancement technology.

Along with impressive desktop publishing capabilities, the LaserJet III is every bit the office workhorse its LaserJet predecessors were. With a printing speed of 8 pages per minute, a 250-sheet paper tray and 1MB of standard RAM, the LaserJet III can serve as a feature-rich network printer.

Although the LaserJet III lacks PostScript, it's only a cartridge (and a recommended memory upgrade) away. And because HP has continued to use cartridge slots, rather than the proprietary card slots that most laser printer vendors have adopted, you have a choice of less-expensive third-party PostScript.

Here the MVP emphasis is clearly on "V," for value.



WINGZ FOR WINDOWS
INFORMIX SOFTWARE
4100 BOHANNON DRIVE
MENLO PARK, CALIF. 94025
(415) 926-6300

WINGZ FOR WINDOWS

Lotus 1-2-3 running on an AT gave the world a universal language for information—a language of rows and columns, sums and divisions. But standalone worksheets on standalone PCs are yesterday's news. As our reach for information becomes more ambitious (across networks to corporate databases), along comes Informix's Wingz for Windows just in time to help.

Wingz speaks the familiar language of spreadsheets. But it also speaks the newer languages of networks and databases, graphical interfaces and presentation graphics.

Wingz's spreadsheet functions are larger than life (32,768 rows by 32,768 columns yield a worksheet with more than 1 billion usable cells). Its 3-D charting, text and drawing functions put most presentation-graphics packages to shame. Written in HyperScript, Wingz is programmable in ways that give new meaning to the word.

Wingz also includes DataLink, a point-and-click query builder that generates SQL code to query Informix databases. This database link moves spreadsheets into the world of client-server applications, and not by accident. Informix's strategy is to make Wingz available as a common user interface across several computing platforms.

You don't need SQL databases to benefit from Wingz's ease of learning and use. At $499, it's a great standalone spreadsheet that makes good use of the Windows 3.0 interface. But with the customizing features provided by HyperScript and the connectivity of DataLink, Wingz is ready for wherever the future takes you.

ULTRA 96
HAYES MICROCOMPUTER PRODUCTS INC.
P.O. BOX 105203
ATLANTA, GA. 30348
(404) 441-1617

HAYES ULTRA 96

With the Hayes Ultra 96, high-speed intelligent modems have dropped to a price that ordinary users can afford—and in a form they'll want to use.

The $1,199 Ultra 96 is a model of the modem's future. It embodies all the features that will be required for high-speed modem communications in the nineties: support for current international file-transfer and modulation protocols and sturdy construction, all backed by a reliable company with a long, reputable record in communications.

The Ultra 96 is also a performance maniac. Although it is rated at 9,600 bps, the Ultra 96 can use newly adopted communications standards to reach 38,400 bps under certain conditions. And because the Ultra 96 supports a wide variety of protocols, it allows reliable access to almost any BBS or public data service. If you dial a modem that doesn't use standard protocols, the Ultra 96 steps down and speaks to the other modem in whatever communications format both understand. This ability to work at the highest common communications denominator means that the Ultra 96 will get the message through or the file downloaded with unheard-of consistency.

Many similar products are sure to follow the Ultra 96. But Hayes has established a high bar for competitors. Once again, it has set a modem standard.

BJ-10E • CANON USA INC. • ONE CANON PLAZA • LAKE SUCCESS, N.Y. 11042 • (800) 848-4123 • (516) 488-6700

CANON BJ-10E

The Canon BJ-10e Bubble Jet is the ideal printer to have if you have to take it with you ... or even if you don't.

Weighing only 4½ pounds, including an optional battery pack, this $499 portable ink jet printer is well-suited for travelers, but you may be tempted to use it on your desktop as well. That's because it produces surprisingly crisp output that actually looks better than that provided by Hewlett-Packard's DeskJet Plus.

The BJ-10e produces Courier and Prestige Elite fonts at four pitches and offers 11 variations of character height and width. This is serviceable for anyone who needs to print while on the road, although the BJ-10e can be further enhanced by downloaded bit-mapped fonts. IBM Proprinter X24E emulation provides compatibility with a number of applications. Unfortunately, the page-and-a-half-per-minute BJ-10e doesn't emulate the HP LaserJet, which limits its usefulness on the desktop.

But if you're on the move, you'll be too happy to care. The Canon Bubble Jet is cleverly designed to conserve space when printing multiple sheets, standing on end and using its cover as an output tray. Such details make the BJ-10e a pleasure to take on the road or to shuttle between home and the office—all at a price lower than that of any comparable portable.

ScanMan 256
Logitech
6505 Kaiser Drive
Fremont, Calif. 94555
(800) 231-7717
(415) 795-8500

ScanMan 256

Today it's desktop publishing. Tomorrow it will be multimedia. There's a pent-up demand to use the PC for graphics, but it awaits the delivery of better image-manipulation tools. Logitech's ScanMan 256 is one of those tools.

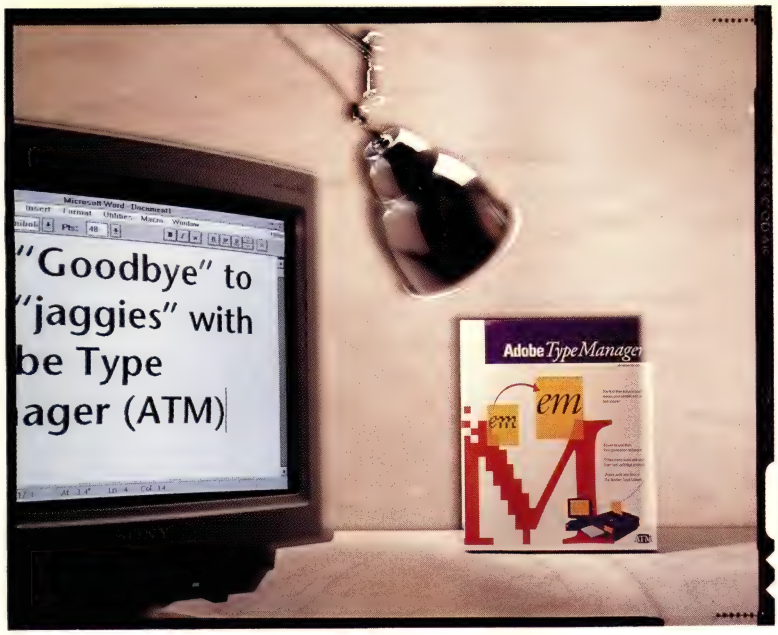
A major improvement in Logitech's hand-scanner technology, the ScanMan 256 produces scanned images of photographic quality that display 256 levels of gray. These are true gray-scale files that can be made into true halftones for publication, not bit-mapped images that use dithering dot patterns to simulate grays and halftones. Images can be scaled without losing tonal fidelity. And they can be edited with Ansel, the ScanMan 256's operating and image-editing software package.

Ansel merits special attention. It doesn't provide the widest range of editing tools, but it does provide the most widely useful ones.

This software offering boasts two features that are absolutely necessary to a hand scanner: It can stitch together multiple scans to capture images larger than the $499 ScanMan 256's scanning head, and it can align images that have been scanned slightly out of horizontal or vertical alignment.

Ansel is a strong Windows 3.0 implementation. It supports the contention that graphical interfaces will make applications easier to learn and use (which can't be said for many first-generation Windows 3.0 applications).

Desktop publishers will love Ansel and the ScanMan 256 for improving the quality of gray-scale images captured for printing. (See page 46 for a full review.)



ADOBE TYPE MANAGER
(WINDOWS VERSION)
ADOBE SYSTEMS INC.
1585 CHARLESTON ROAD
P.O. BOX 7900
MOUNTAIN VIEW, CALIF. 94039
(800) 83-FONTS
(415) 961-4400

ATM FOR WINDOWS

It's ironic that it takes a $99 utility program to turn your expensive Windows-equipped computer into a true Wysiwyg graphical environment. Windows itself doesn't do it and neither do most Windows applications. Adobe Type Manager for Windows does it.

Under Windows' font-management system, you're stuck with a meager selection of typefaces and sizes. ATM offers a cornucopia of type that appears onscreen precisely as it will appear on your output device. Margins will match, bold will be bold, jagged edges will disappear. At last, you'll see how your screen fonts look in a document without wasting a ton of trees printing draft copies.

Installing and using ATM couldn't be easier. After a five-minute installation routine, you'll have 13 scalable typefaces in Times Roman, Helvetica, Courier and Symbol. If you'd like more, Adobe sells a huge selection of typefaces that you can install in ATM.

The effect is marvelous. Install ATM and each of your Windows applications instantly sports 13 new typefaces that can be scaled and output to all of the devices that Windows supports.

ATM also offers a new lease on life to aging dot matrix and laser printers that are shipped with only a few internal fonts. ATM generates PostScript-quality output on a slew of non-PostScript devices.

Although some may view ATM as a stopgap measure until Microsoft delivers operating systems that contain TrueType, Microsoft's scalable font solution, ATM is a real product that solves a real problem elegantly and effectively. Our eyes are grateful.

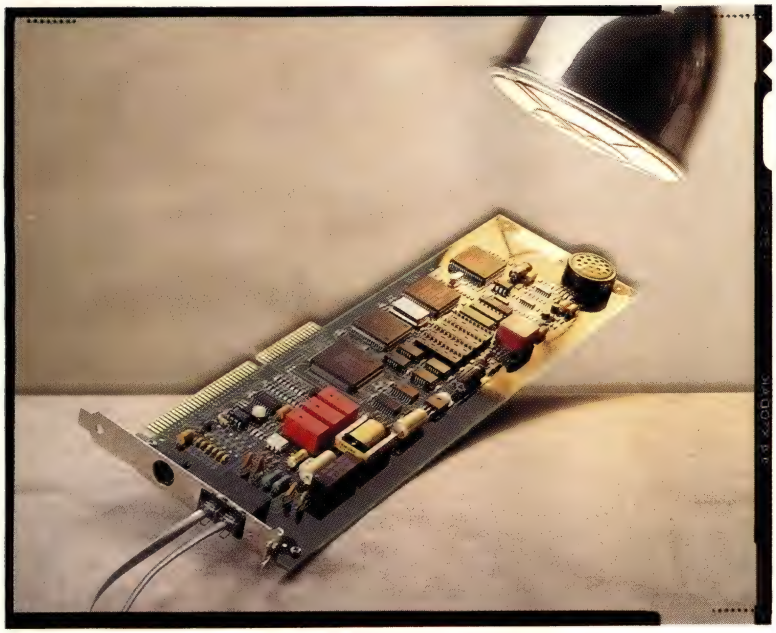
ALR BusinessVEISA
Advanced Logic Research
9401 Jeronimo
Irvine, Calif. 92718
(714) 581-6770

ALR BusinessVEISA

ALR's BusinessVEISA is a little machine that grows with you. With its CPU on a board, it takes only five minutes to transform the VEISA from a respectable 20MHz 386SX PC to a blazing 33MHz 486 (or to an intermediate 33MHz 386 or 25MHz 486). The swappable CPUs make upgrading less expensive and less bothersome because the only thing you change are the boards—there's no drive to back up and restore, no system setup to reconfigure. And you sacrifice nothing for such versatility. The VEISA in any of its incarnations runs as fast as any comparably powered PC.

This small-footprint desktop PC has room to grow inside, too, with most of its slots and one drive bay open. The machine's EISA bus means you can use AT-class expansion boards now and 32-bit boards in the future without losing your investment.

And for a machine with so much potential, that investment is relatively modest: $4,299 for the starter 386SX with a 110MB drive, 2MB of RAM and a 32MB RAM cache. Upgrades range from $999 to $3,195, depending on how big a jump you take.



SatisFaxtion
Intel Personal Computer
Enhancement Operation
C03-07
5200 NE Elam Young Parkway
Hillsboro, Ore. 97124
(800) 538-3373

Intel SatisFaxtion

Intel perfected PC-based faxing this year by transforming its Connection CoProcessor into the state-of-the-art SatisFaxtion board. The company has slashed hundreds of dollars from the CoProcessor's price and added a slew of new hardware and software features.

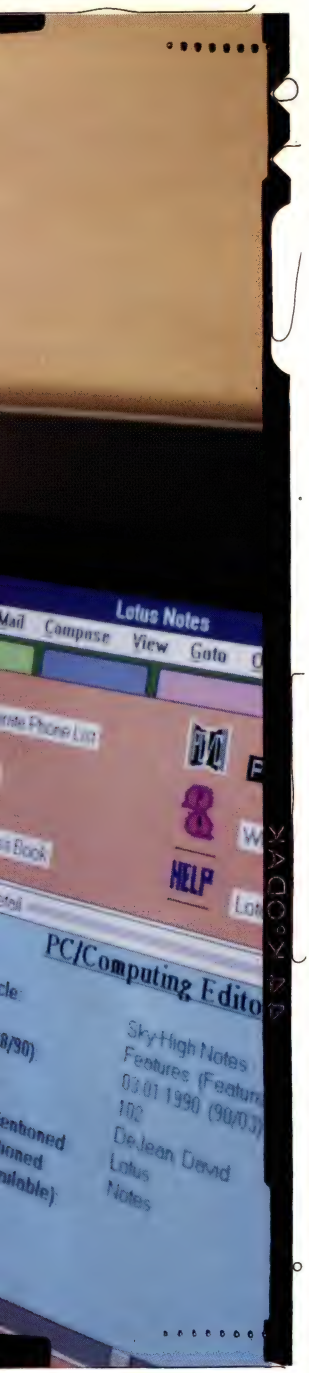
With an on-board 16MHz 80186 chip to handle fax processing, SatisFaxtion truly faxes in the background, unlike boards that take control of your PC when sending or receiving faxes. (See page 272 for comparisons.) Innovative software lets you run SatisFaxtion under DOS or Windows. Installation, so often a problem with fax boards, couldn't be easier—there are no switches or jumpers to set.

The $499 SatisFaxtion board includes a 2,400-bps modem that is compatible with MNP level 5 error-correction protocols; when you communicate with other MNP 5 online services or modems, your effective throughput reaches 4,800 bps. A scanner port is included as well, and Intel offers an optional $399 handheld scanner.

The board is so well designed that it may compel other board makers to adopt the DCA/Intel Communicating Applications Standard, eventually leading to lower prices and a greater variety of third-party fax software.

But there's really no need to wait for prices to fall and more software to become available. SatisFaxtion is the board that finally makes PC faxing as easy and inexpensive as using a standalone fax machine.

NOTES • LOTUS DEVELOPMENT CORP. • 55 CAMBRIDGE PARKWAY • CAMBRIDGE, MASS. 02142 • (800) 437-6391 • (617) 577-8500



LOTUS NOTES

For years, "groupware" has been more myth than reality. The advent of Notes made 1990 the year groupware got real. Notes helps each member of a group know what other members know. Simple as that sounds, it represents a mouth-watering and elusive business benefit that requires a rich, complex product to deliver.

Essentially, Notes is group communications software that helps people using PCs create and access shared information. It encompasses three major functions: text editing, document management and wide-area electronic communications. Notes delivers these capabilities to all members of a group in a high-security environment across a standard PC local area network.

Notes is true client-server software—perhaps the first useful member of that tribe. The server program runs under OS/2 on a networked PC that's dedicated to managing a group's documents and communications. The client software, which runs on all Notes users' PCs under DOS and Microsoft Windows or OS/2 Presentation Manager, manages the program's graphical menu-based interface, gives users tools for such tasks as creating documents or editing text and provides access to databases on the server.

Notes' capabilities are completely customizable, allowing you to design databases that reflect specific projects or purposes. This programmability means that database applications can be adapted to meet the information needs and working patterns of Notes users, rather than forcing them to change the way they work as a group to use Notes.

Of course, Notes isn't for every group. With an entry price of $62,500 for 200 users, how could it be? But it is a ground-breaking collection of concepts that will change the course of application software for networks, from its "desktop" interface to the way it keeps multiple copies of databases updated and in sync across inexpensive dial-up lines.

With Notes, groupware has at last come into its own.

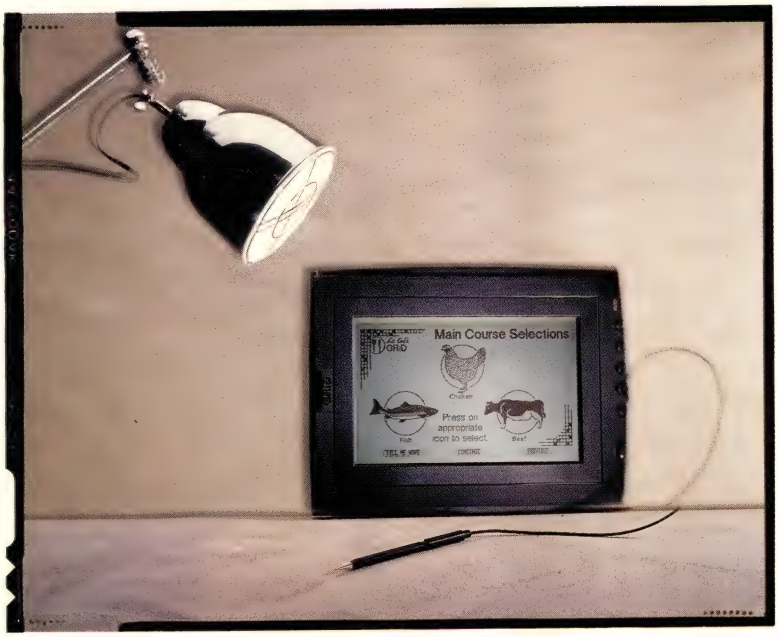
ENSEMBLE
GEOWORKS
2150 SHATTUCK AVE.
BERKELEY, CALIF. 94704
(415) 644-0883

GEOWORKS' ENSEMBLE

With Ensemble, tiny GeoWorks did what Microsoft and IBM deemed impossible: It built an easy-to-use, multitasking graphical operating environment that runs smoothly on XT-class PCs. While Windows and OS/2 begin to stall on PCs that have less than a 386SX microprocessor, 2MB of RAM and a 40MB hard disk, Ensemble provides snappy performance on any hard-disk-equipped PC, even an 8088.

Impressive as that may be, it's just the beginning of Ensemble's versatility. Although its ability to run on low-end machines would suggest countless compromises in performance and capability, the $195 Ensemble is neither a toy nor a smoke-and-mirrors imitation of a graphical environment as Tandy's DeskMate is. Instead, it is a technically impressive product regardless of hardware platform. (See page 45 for a more in-depth review.) Ensemble even outduels Windows in some areas: It offers a true, multithreaded, pre-emptive multitasking environment that Windows can't match, scalable outline fonts that Windows lacks and, when running on the same level of hardware, significantly faster performance than Windows.

True, Ensemble won't be a power on high-end PCs until more developers line up behind it. But the suite of applications that Ensemble includes—word processor, drawing program, calendar and Rolodex—is remarkably capable. We look forward to seeing Ensemble proliferate on laptops, on PCs for home and small-office use and on the millions of PCs that lack the power to run Windows or OS/2.



GRiDPad
GRiD Systems Corp.
47211 Lakeview Blvd.
P.O. Box 5003
Fremont, Calif. 94538
(800) 222-4743

GRIDPAD

A ground-breaking product deserves recognition, even if all the individual technologies that have gone into making it aren't absolutely spectacular.

GRiD Systems' GRiDPad computer shows that handheld pen-to-screen input can work effectively on a DOS-based computer. Essentially a black rim surrounding a 10-inch, 640-by-400-pixel screen with an attached stylus, the GRiDPad is a 10MHz 80C86-based computer with handwriting recognition burned into ROM. Users write instructions to the computer directly on the screen with the stylus. Because it weighs only 4½ pounds, you can cradle the GRiDPad in one hand like a clipboard and write on the screen with the other. Tap twice with the stylus on the display, and the GRiDPad shows you a screen rendering of a keyboard on which you can hunt and peck with the stylus to run DOS applications.

Although the GRiDPad was designed primarily for use with electronic forms in such vertical-market applications as route sales, insurance claims adjusting and exit polling, the company expects it to evolve into the mainstream. With a short learning curve and a battery that lasts up to eight hours, that's not an improbable scenario.

Waiting in the wings, of course, are several pen-based hardware, software and operating system products that hold the promise of improved features and utility. But the GRiDPad has sparked the field of inquiry. This $2,370 machine is the only DOS pen-based notebook computer available. Expect to see future GRiDPad iterations still blazing trails.

QMS-PS 410
QMS
One Magnum Pass
Mobile, Ala. 36689
(800) 631-2692
(205) 633-4300

QMS-PS 410

The era of the personal PostScript printer has arrived, ushered in by the sleek QMS-PS 410. It could be the premier PostScript printing value simply by virtue of its almost-too-good-to-be-true $2,795 price.

But it's the extras the PS 410 brings to the PostScript party that really make it shine. Most PC PostScript printers have 35 scalable typefaces; the PS 410 has 45. There's a healthy 2MB of RAM, plus an AppleTalk interface that comes standard with serial and parallel ports.

Such features, not to mention the space-saving size and the crisp-looking output, obviously make the PS 410 a wonderful desktop printer. But you'll gain additional productivity if you share it with a few colleagues. All three of the PS 410's port connections can be used at once, with the printer deftly handling traffic on a first-come, first-served basis. And if someone in the group sends output that requires HP LaserJet II emulation rather than PostScript, the PS 410's software automatically directs the switch.

The PS 410 does have its limitations, such as a poky 4-page-per-minute print speed. And with a meager 50-sheet paper tray, this printer will never serve more than a small group, although capacity can be boosted with a 250-sheet feeder tray for $195. The two card slots are proprietary, and offerings are currently limited.

But any limitations of the PS 410 are easily offset by its fabulous features and price. The bottom line is that the QMS-PS 410 is the best PostScript printer value available today, and it sets the pace for the PostScript printer of tomorrow.

QEMM 5.1
DESQVIEW 2.3
QUARTERDECK OFFICE SYSTEMS
150 PICO BLVD.
SANTA MONICA, CALIF. 90405
(213) 392-9851

QEMM 5.1 & DESQVIEW 2.3

Still the best way to multitask DOS applications, Desqview received an award-winning boost this year, thanks to an upgrade to QEMM, Quarterdeck's memory management program.

By itself, QEMM provides a way to load those RAM-hungry memory-resident utilities, network drivers and peripheral drivers into the limbo region of memory called high DOS, freeing room below 640K for applications. By itself, Desqview is a stable and time-tested method of multitasking standalone DOS applications, even such notably ill-behaved programs as Lotus 1-2-3.

Now, by combining Desqview and QEMM 5.1 ($219.95 for the two) with Windows 3.0, you can create a nearly unbeatable platform for running DOS or Windows applications. Previously, QEMM wouldn't run in Windows' 386 Enhanced mode, its most powerful configuration. This meant that 386 PC users faced a devil's dilemma: QEMM's memory efficiency or optimum Windows performance. But with QEMM 5.1, it's possible to load all those bulky TSRs and network drivers into high memory and still take advantage of Windows 3.0 in the 386 Enhanced mode.

In addition, Desqview 2.3 adds value to Windows by letting you run Windows in either Real or Standard mode in a Desqview window. The benefit is that Desqview can multitask DOS applications (which it does very well) while still providing Windows services and applications. If you have enough memory to pull this off (generally 2MB or more), you can have the best of both worlds. (See page 64 for a complete review.)

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The $149 OmniKey/Ultra contains other tricks, too. In addition to the numeric keypad, there's a full set of cursor control keys in the same configuration we're accustomed to from XT days. You can also change the rate at which keys repeat themselves. A second Shift Lock key prevents the comma and period keys from typing "<" or ">". And for our fumbling fingers, the Print Screen key doesn't work unless you hit it twice. The keyboard itself has a crisp feel.

Now PC users will have to find something else to quarrel about.

... AND SOME JUST MISSED THE SPOTLIGHT

Each year, inevitably, some worthy products barely miss the final cut for our MVP awards. This year, in particular, strong feelings were expressed in favor of some runners-up. Here's a rundown on the products it was hard to leave behind:

IBM's PS/1. Some editors love it (particularly those from our Prime Time section, which deals with non-traditional offices—the prime location for PS/1s). Others hate it. Nobody's a middle-of-the-roader on this one. One view: The PS/1 redefines and reinvigorates the home market. The opposition: It's an ugly piece of tin that pales in value when compared with many other manufacturers' low-priced 386SX machines. The controversy kept the PS/1 off our final MVP list, but any product that generates this much passion clearly bears watching.

SuperPrint 1.1. This major upgrade of a well-known product (reviewed on page 48) does most of what Adobe Type Manager does. Adobe is a bit faster onscreen; SuperPrint is quicker at the printer. It took a photo finish to determine the winner in this category. In the end, we gave the nod to ATM because of its unique cross-platform compatibility—the Macintosh's presence in desktop publishing represents a unique advantage for ATM. But SuperPrint is impressive, especially for those who have already invested in existing PC fonts. If Mac-PC integration doesn't loom large on your agenda, but wide font support does, make sure you check out SuperPrint 1.1.

The Brick. Another object of heated debate. This CPU-on-the-move (you hook it to monitors and keyboards at various work locations) was originally cut from the MVP rolls late in the nominating rounds but generated an unprecedented write-in response during MVP balloting. It didn't garner enough votes to make the final list, but Brick adherents fought to the bitter end. Their position: This product, though saddled with an unfortunate name, was engineered with the way people actually work in mind. It answers the question of how to transport an entire environment to and from several work sites, something no other product handles elegantly. The opposition: No product that requires lots of plugging and unplugging—not to mention redundant, expensive support systems—counts as elegant. If the vote had been taken a week later ...

Current. IBM's personal information manager was unanimously acknowledged as the best PIM yet. It failed to make the finals because many editors felt that where PIMs are concerned, the best still isn't good enough. This category cries out for that magical moment when it becomes clear exactly what these products can do to help millions of users. The root of the debate: Those among us who use Current love it; those who don't feel no compulsion to start. Something's still missing from PIMs.

Aldus Persuasion 2.04 for Windows, Microsoft PowerPoint for Windows, Micrografx Charisma, Cricket Presents Windows 1.2. This category had the same problem that many Democratic primaries have—a lot of candidates, all wholesome and worthwhile, but none so distinctive as to become undeniable. All these new-generation presentation graphics packages make great strides over their predecessors. They share many core concepts, but each sports unique features. Unable to choose one from the crowd, we've decided to wait and see how customers vote. If we gave an award in the Most Improved category, however, presentation graphics would have been a shoo-in.

Thinx. This Bell Atlantic decision support software drew high praise from some and pleas for enlightenment from others. The consensus seems to be that this product could be great if enough users are willing to draw their PCs this intimately into complex decision-making processes. Not enough of us were sure this group exists to award

IBM's Current copped honors as the best PIM yet; the DVA-4000 video board will be dynamite when multimedia PCs arrive; the PS/1 sparked plenty of debate, as did The Brick.

an MVP to what is unquestionably a unique and trend-setting program. Sometimes clichés are true: Thinx may be ahead of its time.

We were also impressed during 1990 by **UltraScript, LANtastic, 386Max, Quicken 4.0** and **Managing Your Money 7.0**, but these products, while finding wide commercial acceptance this year, actually were shipped earlier. Most of them had new versions during 1990, but we didn't think those incremental improvements merited MVP status.

During 1990 we sensed a coming explosion in high-end graphics. In fact, we were besieged by snazzy display wares. A couple of these products made this year's MVP ranks. Others missed the list only because we think the impact of their technical wizardry lies farther down the road. The **DVA-4000** video capture and display board is an example; when multimedia PCs arrive, this board will be a monster, but not until then. Likewise the amazing **Renderman** 3-D graphics specification, which has produced award-winning videos. We don't think mainstream PC users are ready to become video producers quite yet.

Another product that amazed us but hasn't yet had a big enough impact on users to make the final MVP cut was the **Edsun Labs Continuous Edge Graphics (CEG)** chip set. Edsun's low-cost display technology could completely redefine the way we look at computers. The three chips make it possible for monitors with VGA and higher resolution to display images that appear to have extremely high resolution and broad color capabilities. While the resolution boost is an effective, rather than a true, increase, the resulting screens look comparable to those displayed by monitors with resolutions as high as 2,048 by 2,048 pixels. Seeing is believing, but not enough people have seen the Edsun chips in action yet. We expect big things from this product in PCs released during 1991.

Finally, a special citation for **SimCity**. In a games world dominated by mindless, shoot-'em-up airplane fights and *Conan the Barbarian* rip-offs, SimCity stands out for its innovation, intelligence, elegance and wit. A simulation in which you build a city step by step (and suffer the wrath of the resident Sims when you misplan, as you inevitably do), this is the first game to take its fun seriously. It's not that SimCity isn't entertaining—it may be the most addictive game ever created—you just don't have to park your mind to play it.

We congratulate the creators of these products. They showed us impressive pieces of work, and we expect them to be in the running next year.

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Performance										
Drawing/editing	(150)	( )	Good	Very Good	Very Good	Very Good	Very Good	Very Good	Satisfactory	Good
Tracing	(50)	( )	Very Good	Very Good	Very Good	Excellent	Very Good	Satisfactory	Poor	Good
Import/export	(50)	( )	Satisfactory	Satisfactory	Very Good	Very Good	Good	Good	Satisfactory	Very Good
Speed	(50)	( )	Satisfactory	Very Good	Excellent	Good	Excellent	Satisfactory	Good	Good
Output quality	(100)	( )	Good	Good	Excellent	Very Good	Excellent	Very Good	Satisfactory	Satisfactory
Documentation	(100)	( )	Very Good	Good	Very Good	Excellent	Very Good	Good	Satisfactory	Satisfactory
Ease of learning	(100)	( )	Very Good	Good	Excellent	Very Good	Satisfactory	Good	Very Good	Good
Ease of use	(125)	( )	Satisfactory	Very Good	Very Good	Very Good	Satisfactory	Very Good	Satisfactory	Very Good
Error handling	(75)	( )	Good	Poor	Good	Good	Good	Very Good	Good	Very Good
Support										
Support policies	(50)	( )	Satisfactory	Good	Good	Very Good	Satisfactory	Satisfactory	Satisfactory	Good
Technical support	(50)	( )	Satisfactory	Very Good	Very Good	Very Good	Good	Good	Very Good	Very Good
Value	(100)	( )	Satisfactory	Good	Excellent	Very Good	Very Good	Very Good	Satisfactory	Very Good
Final scores			**6.0**	**6.4**	**8.2**	**7.7**	**6.9**	**6.8**	**5.4**	**6.5**
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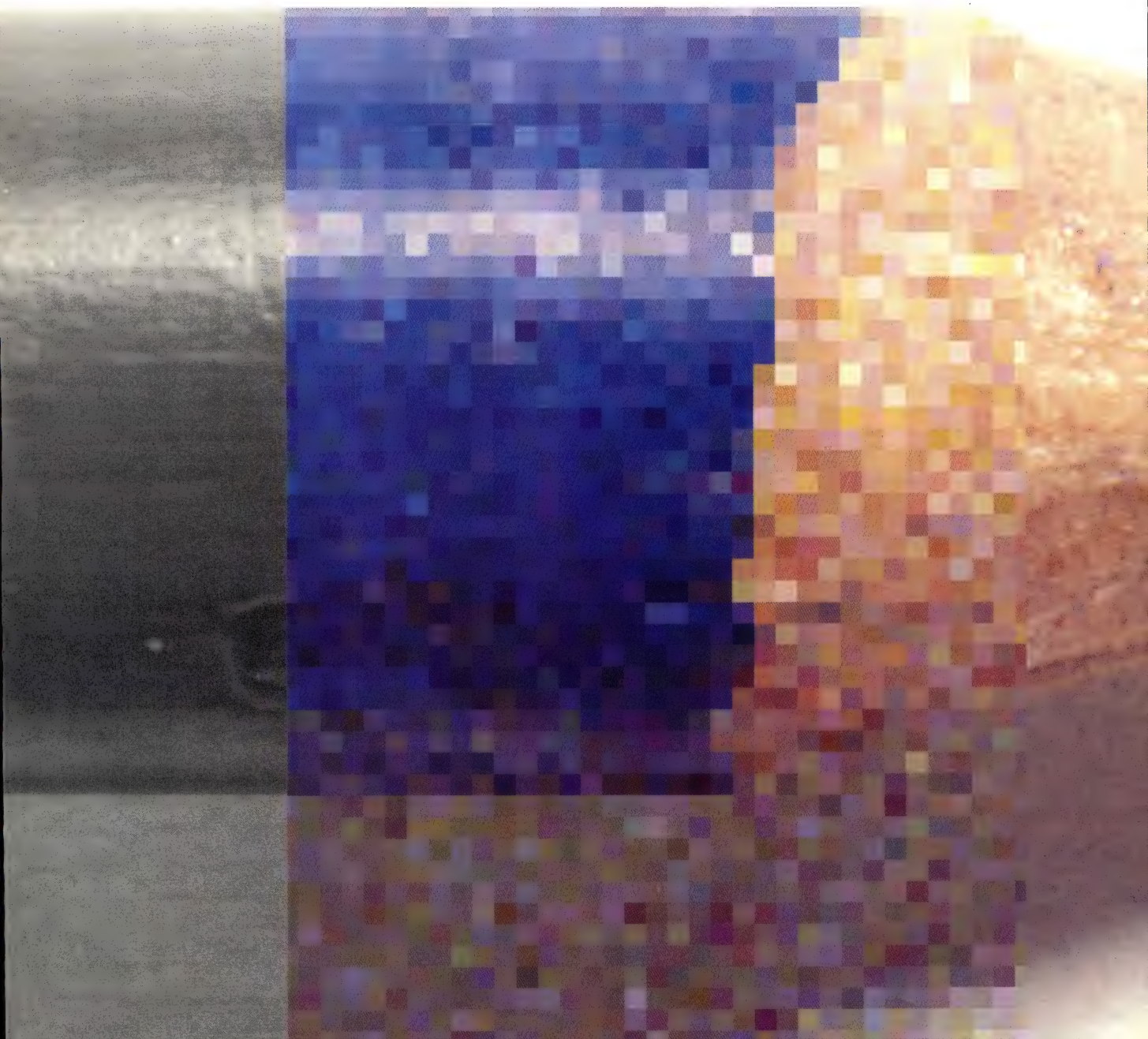
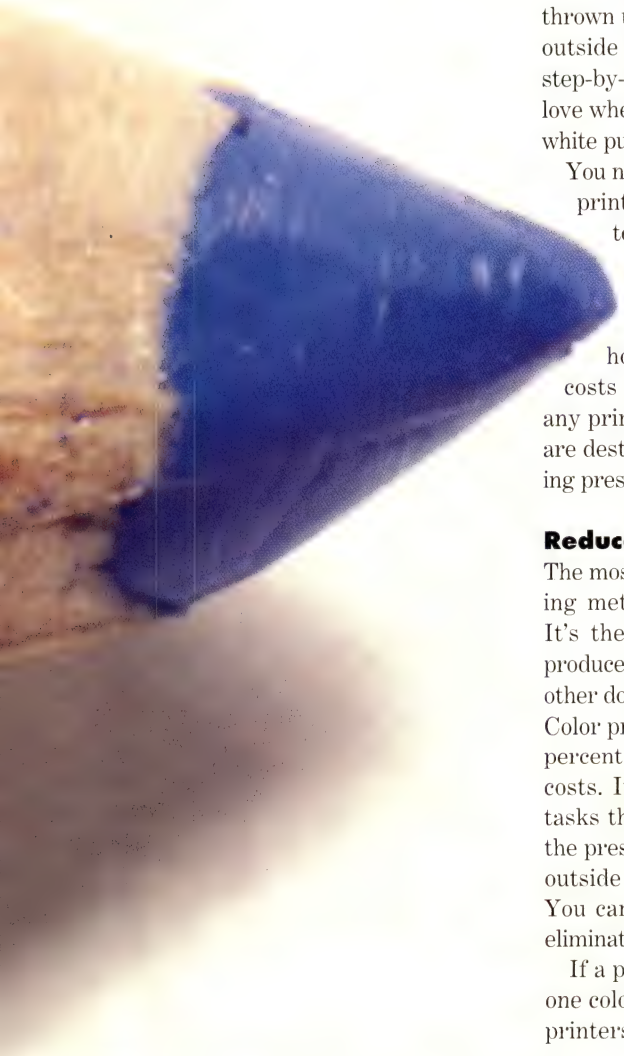


T TO PC PUBLISHING

Use your PC to cut costs and maintain control over color print jobs.

BY SHARYN VENIT



DO-IT-YOURSELF PUBLISHING IS not what it used to be, thanks to new desktop publishing and graphics programs that let you, your PC and your laser printer create effects that once required the services of outside typesetters and designers.

But when it comes to adding color—even embellishing a simple publication with color type, rules and photographs—you may feel helpless. Perhaps you've settled for uninspiring black-and-white reports and newsletters because you lack the know-how and resources for color print jobs. Maybe you've thrown up your hands and hired an outside designer, sacrificing the step-by-step control you've come to love when creating your black-and-white publications.

You needn't be grounded by color print jobs. In fact, better desktop publishing programs are making it more practical and economical than ever to use your PC and an in-house color printer to cut costs and maintain control over any print job, including those that are destined for a traditional printing press.

Reduce Prepress Costs

The most common traditional printing method is *offset lithography*. It's the cheapest, fastest way to produce brochures, newsletters and other documents in large quantities. Color press time itself adds only 10 percent per color to offset printing costs. It's prepress work—all the tasks that need to be done before the presses roll—that really makes outside color printing expensive. You can use your PC to lower or eliminate many of those costs.

If a page is to be printed in only one color (black is a color as far as printers are concerned) and the page contains only text and line art, the traditional prepress steps are simple. The printer photographs the page and develops the negative, which is used to etch an image onto a metal plate coated with a light-sensitive material. The plate, in turn, goes on the presses and transfers ink to paper.

Pages with photographs and those printed in multiple colors are more complicated. The print shop makes a full-page negative for every color being used and "strips" each one by hand, taping over blank areas and masking out elements that should not be printed in a certain color.

Because these traditional methods demand time and skill, they are costly. You need long print runs to make the per-piece cost economical. Or you can assign the work to one of the new desktop color applications. With their built-in ability to perform many prepress steps, you can afford to print fewer than 1,000 copies of a color newsletter or brochure. And these programs make it easier and cheaper for you to play with different design concepts before committing yourself to a large color print job.

You can create a color document on your PC's screen and print it on your own printer, but you don't deliver a full-color printout of a page to your commercial printer. Instead, you must create separations, black-and-white images of each page for each color of ink.

Both *spot color* and *process color*—the two methods of color printing—require separations because each color is printed with a different plate. Each spot color is printed with a single, solid color of ink that is mixed to produce the desired shade before the ink is put on the press. Process color, on the

other hand, uses four inks—the three subtractive primaries (yellow, cyan and magenta) plus black—printed one on top of the other in a pattern of halftone dots.

Use spot color if your document has no more than two or three colors altogether. Also, check with your printing company: Many offset printers have only two- or three-color presses; process color requires a four-color press. Process color is necessary for printing continuous-tone color images (such as color photographs and illustrations). Because process colors are "mixed" on the press rather than before printing, they allow a much wider range of colors and shades than spot color does.

Separating color elements absorbs a large share of traditional prepress budgets, but the task can be handled less expensively with your PC. Desktop publishing programs such as PageMaker and Ventura Publisher offer spot color separation as a print option, while some color graphics software packages (Micrografx Designer 3.0 and Corel Draw, for instance) create separations for both spot and process color.

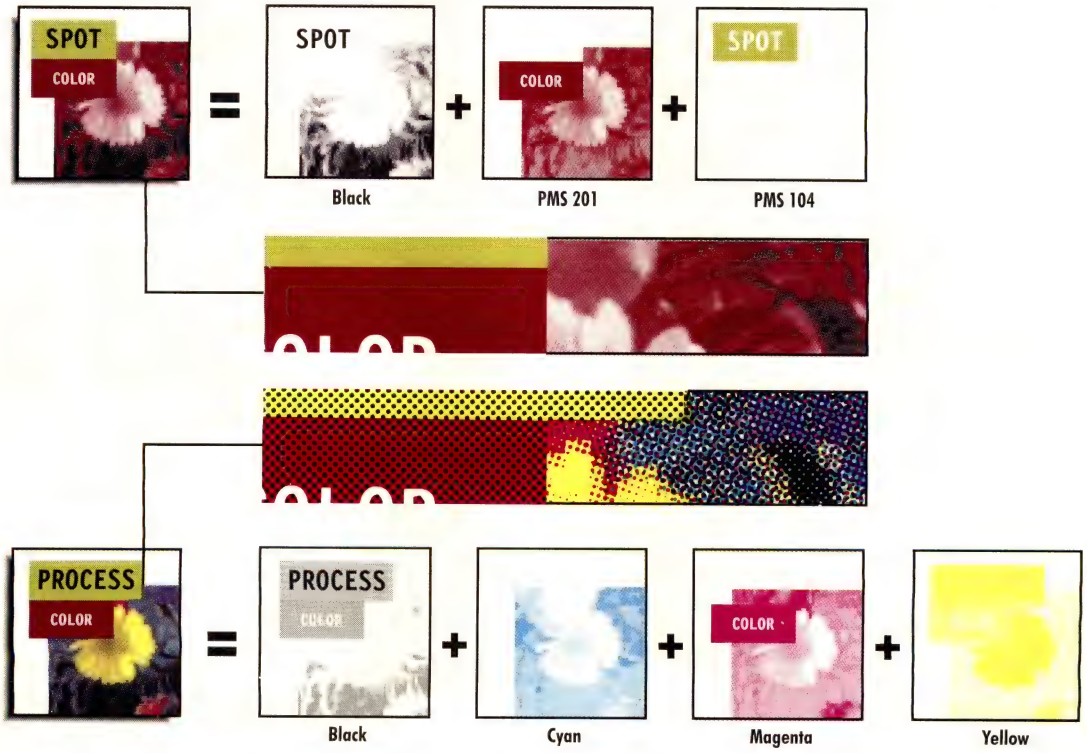
If the graphics or desktop publishing program you use doesn't print color separations, add-in color separation/correction software is available. Publisher's Prism, $695 from InSight Systems in Vienna, Virginia (800-688-0250), is one such product. A PostScript color separator, Prism generates a set of four film negatives that are used to prepare the process-color plates. Both DOS and Windows versions are available.

Highlight with Spot Color

Desktop publishing programs with color capability do amazing work, considering how much effort and

SPOT COLOR VS. PROCESS COLOR

SPOT COLOR: Here, three colors are used in spot color: black plus two match colors. As with four-color process, various percentages of each color can be combined, allowing many color variations. The main benefit of spot color is color precision: depending on which matching system you are using, you can choose from among 600 custom-mixed colors, many of which can't be matched by four-color process. The downside is the breadth of color choice: four-color process is the only efficient way to match the color in photographs and art.



PROCESS COLOR: The four process colors—black, yellow, magenta and cyan—are combined in various percentages. The main benefit to using process color is versatility: Nearly the entire spectrum can be matched with just these four colors. Process color is the only efficient way to reproduce photographs and art for printing. The downside is color purity: most of the colors are created by printing dots of one color on top of another, resulting in registration problems when printing fine type and rules.

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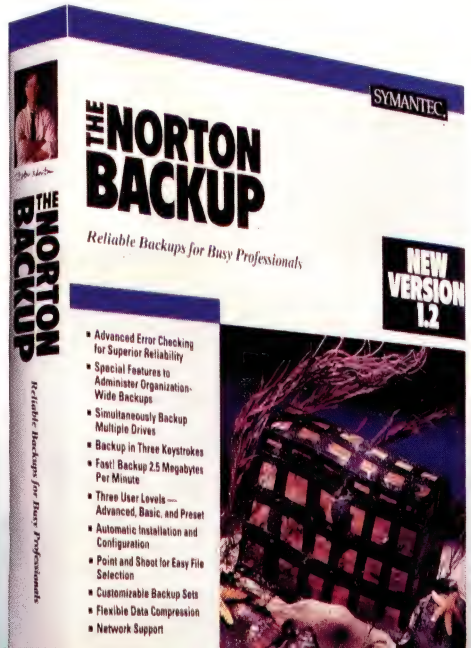

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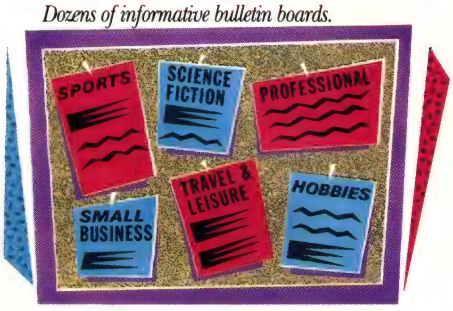

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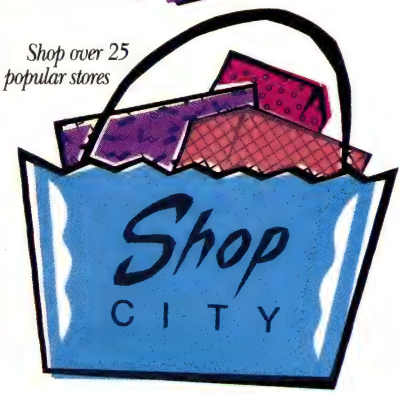

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CIRCLE NO. 109 ON READER SERVICE CARD.

painstaking care go into the traditional prepress steps. For spot color, the printer shoots the mechanical once for each color and, each time, masks out or opaques areas that don't use that color. If elements in different colors touch—for example, purple type in the middle of a red circle—special care must be taken to ensure that those elements meet precisely. Highly trained craftspeople work as meticulously as surgeons to cut the *traps* and *butts*—edges around artwork where two colors will meet on a page. If the trim is off by as much as a knife's edge or if the final plates are out of alignment by a hairline, you'll see a flaw in the printed piece.

PC programs that support spot color separations (including Micrografx Designer 3.0, Corel Draw and PageMaker) make the separations part of the print command. When you print a page for spot color, the application prints one page for each color used. One page contains all the elements that will print in black, another contains all the elements that will print in, for example, red and so on.

The printouts are actually in black, no matter what color they represent. Images don't become color until color inks are pressed onto the paper. The application handles the fine edges between colors; the *registration marks* it prints on each page are used later to align the negatives.

Color-Matching Systems

In addition to separating elements for spot color, you need to tell the print shop exactly which ink colors you want them to use. Commercially printed colors rarely appear exactly as you preview them on-screen or on a color printout, however. The most precise way to specify color to the print shop is to use a color-matching system.

The most common of these systems is the Pantone Matching System (PMS). PMS ink swatchbooks can be purchased at any graphic arts supply store. Use a swatchbook

THE GRAY AREAS OF COLOR

Consider these factors to determine your chances for successful color publishing on the desktop.

Quality

If an image begins as a color photograph, the scanning process has the first and most dramatic effect on quality. Good color scanners cost as much as $30,000. Unless you use color photographs enough to justify that kind of expense, it's better to have an outside service bureau do the scanning.

Next, quality is affected by the sophistication of your graphics or image processing software. For example, *undercolor removal*—removing colors to make dark areas less muddy—is an important quality-control feature. It's standard on expensive color prepress systems but is not available with most desktop programs. If you're serious about color publishing, don't settle for low-end software, and be aware that even with high-end color prepress systems, color production is always a compromise. What you see on any screen display is almost never what you get on paper.

Color separations also affect quality. A good color-separation program translates the standard additive primary colors (red, green and blue) to the subtractive primaries used in printing (cyan, magenta and yellow). The conversion formulas are complex, and more sophisticated separation software costs more.

Desktop technology makes color printing cheaper and faster, but not better—yet. Many publishers who use desktop systems to develop their ideas in color still farm out all color separation to the offset print shop.

Storage

Color documents require more disk storage space than black-and-white documents. A color scan saved at moderate resolution requires as much as 8MB of disk space; images saved at high resolution require much more. These large files mean that to work in color you need more memory and more disk space—and more time (see below). New color compression techniques and high-density storage media such as CD-ROM can help.

Speed

Scanning and printing color images takes longer than for black-and-white images. It may take 30 minutes to scan a full-color page using a high-end scanner that captures all the information needed for process-color separations. This is fine if you're producing a monthly newsletter with only a few color images, but not for a daily paper. And it takes longer to import, display, copy and transmit documents with color.

Standards

The lack of standards among graphics and desktop publishing programs means you may need another program in addition to your desktop publishing software to separate color. For example, PageMaker prints spot color separations for elements colored in PageMaker itself, but it doesn't separate imported color images. In a perfect world, a few standard color formats would be supported by all desktop publishing and graphics applications.

Cost

When calculating how much you're willing to invest in bringing color printing capabilities in-house, include the cost of added memory, storage capacity, a color monitor, a color scanner, a color printer or slide recorder, the added cost of color offset printing for large jobs and the cost of operator training. Color manipulation is a complex craft. A software application may be easy to learn and use, but it won't give you the results you want without extensive experience and experimentation. Expect to pay more for a technician who is skilled in color manipulation or to pay an outside service bureau for the final color adjustments and separations. **SV**

to select the PMS colors that match the shades you want in your publication and to identify them to the printer. Printers either use published formulas to mix PMS colors or mix the inks they have to match any swatch you provide.

Process Color for Variety

Four-color printing permits a wider range of colors than is possible or economical with spot color. Process colors can look very much like spot colors, but they're not actually printed as a solid color. Instead, they're combinations of dots (or *halftone screens)* printed in four colors. Each of the four screens is shot at a slightly different angle to create the illusion of a smooth, continuous tone. (If the screens are not angled properly, the dots may print on top of one another or create moiré patterns of wavy or plaid lines where dots overlap.)

Using process color is less expensive than using spot color when you want more than four colors on a page. For example, you can create what appears to be a solid block of standard blue by printing screens of cyan and magenta in equal proportions—a 50 percent screen of cyan and a 50 percent screen of magenta. Varying the density of these screens produces other colors. Reduce the proportion of cyan ink to 30 percent and increase magenta to 70 percent, and you have purple. Reduce the proportion of magenta to concoct various teals and turquoises. Using this process means that instead of paying for 10 plates for 10 different spot colors, you can

COLOR PRINTERS FOR IN-HOUSE JOBS

Use a professional offset press for large jobs, but small jobs can be done quickly and cheaply on your own color printer.

For anyone familiar with black-and-white desktop publishing, color is a logical step. You design and edit your page as you would a black-and-white document, incorporating line-art illustrations or scanned images if you wish. Then you assign colors and shades to elements you want to print in color, such as borders and headlines.

Most publishing software works with a variety of color printers, from low-end dot matrix models to expensive thermal transfer machines. One of the most difficult tasks in desktop publishing is choosing a printer that matches both your budget and the type of work you want to do. All of them make snappy work of short-run office publications, overhead transparencies and color handouts. Here are some of your options when choosing a color printer.

At the low end you'll find dot matrix color printers—the 24-pin $949 Epson LQ-860 is a good example. Dot matrix color printers use color ribbons and mechanical printheads like those found in low-end black-and-white printers. There are trade-offs for the low price tags, however—you get low resolution, slow printing speed (the Epson moves along at just 82 characters per second), a limited color palette, poor color quality and *banding* (streaks across the printed image that result from the moving carriage). Nevertheless, a dot matrix color printer is a worthwhile investment for in-house presentations and for printing rough proofs of color images you plan to have printed by an outside company.

Further up the scale are color ink jet printers, which spray color inks onto a page—these include the $2,495 Hewlett-Packard PaintJet XL. Ink jet printers offer higher resolution, faster printing and better-quality color than dot matrix printers.

At the high end, you'll find a variety of exotic technologies, including thermal printers that use heat to seal color pigments in a wax or plastic coating onto mylar, laser printers that use color toner cartridges and thermal dye printers that approach photographic quality. Thermal printers start at about $10,000; a popular model among desktop publishers is the QMS ColorScript 100 Model 10, which lists for $9,995. The big investment makes sense only if you do frequent, high-volume color printing.

Before buying a color printer, make sure the software you use comes with a driver for it. Dot matrix and ink jet printers are not PostScript printers, for example, whereas most thermal and laser color printers do support PostScript.

DOT MATRIX: Output from the $949 Epson LQ-860 suffers from *banding*—streaks that result from the moving mechanical printhead. Still, it's an inexpensive choice for in-house use and rough proofs.

PHOTOGRAPHS BY STEVEN GREENBERG

create all 10 colors with only the four process-color plates.

Traditionally, you'd tell your printer what PMS shades you want to match and the printer would create the angled screens needed for those colors. Now some desktop applications let you specify colors as percentages of primary colors, and either the graphics application or a special separating application prints the separated screens. For example, Corel Draw and Micrografx Designer print process color separations to any PostScript device. PageMaker and Ventura don't support process color, but you can make process-color separations for documents created with these applications with InSight Systems' Publisher's Prism.

Photographic Color Services

Four-color process printing is the only method currently used to print continuous-tone color images, such as color photographs. High-end graphics programs have the basic capabilities for separating digitized art (hardcopy art captured electronically) as well as art created on computers. Other programs perform color correction and retouching on computerized color images. These methods won't produce continuous-tone separations that rival those produced by printers and engravers, but they are reasonable alternatives for publications on tight budgets and with fairly low quality requirements—an internal company newsletter, for example. For professional-quality reproduction of color photographs published in, say, a sales bro-

If your application runs under Windows, it can print to any printer for which you have installed the Windows driver.

Besides compatibility and the cost of the printer itself, factor into your buying decision the cost of supplies. Most ink jet and thermal color printers require special coated paper or special transparent film for overhead transparencies. You'll need to stock color ribbons, ink cartridges or toner cartridges. You'll be surprised how quickly these supplies vanish when you're printing full-page color images with solid-color backgrounds.

If you don't do enough color printing to justify a high-end printer, a low-price printer is still good for small jobs—less than a dozen copies—and for transparencies. If you need more than a dozen or so copies, the slow printing speed and cost of color cartridges or inks make it more economical to print only one color master and reproduce that master on a color copier.

For large jobs—several dozen copies or more—a low-end printer helps cut costs by preparing your documents in-house and printing low-quality color proofs for review by writers and designers. When everyone's happy with the design, you can save the document to a file and give it to an outside printer, who can choose the printing method that best suits your needs and budget. **SV**

INK JET: The $2,495 Hewlett-Packard PaintJet XL sprays color inks onto the page. It uses the same four colors as the other two machines, but shoots them onto the page simultaneously—the others lay down one color at a time.

THERMAL TRANSFER: The QMS ColorScript 100 Model 10 has the richest colors, the best resolution and the highest price: $9,995. Required supplies (coated paper and ink ribbon film) are also expensive.

12 TIPS FOR BETTER COLOR

Whether you're printing color in-house or sending out, follow these tips from design experts to use color wisely.

1) Use color to enliven your publication, to emphasize and organize ideas for your readers. Don't use it just because it's available.

2) Use the same color scheme throughout your publication. Create a color style sheet to ensure consistency.

3) Use no more than four distinct colors per page. Too many colors will confuse rather than clarify your message.

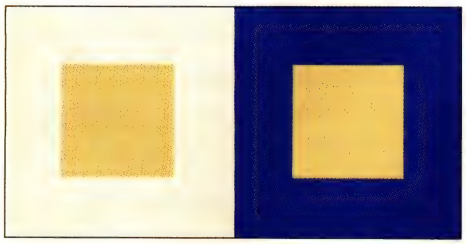
4) Use standard colors and page placement for your company logo and section headings. Bouncing images distract the reader.

5) Use restraint when running rules, bullets, bars and other graphic elements in color.

Ensure at least a 30 percent difference in tone value between type and its background.

6) When using colored type, use a simple typeface in a size large enough to be legible.

7) Be sure there is at least a 30 percent difference in tone value between type and its background color.



Be aware of how colors look together.

8) Bright colors are fine for headings but not in text—they tire the eye.

9) Be aware of how colors look together. The same color looks lighter on a dark background, darker on a light background. The same color looks cooler on a warm background, warmer on a cool background.

10) Make sure the colors you choose have similar values (lightness or darkness) and intensities (dullness or brilliance).

11) Choose colors that can be reproduced accurately on the paper you'll use. For instance, colors appear lighter on coated paper than on uncoated paper.

12) Use pale color to keep a large tinted area within a document from overwhelming the message. For small areas, use bolder color. **JAN WATTS**

chure, use an outside color service in order to get a completely professional look.

Specialty firms offer access to a wide range of high-quality input and output devices, software and techniques for color images. Although low-end color scanners are great for preparing images to view onscreen or in slides, they're generally not good enough for full-color photographs. A service bureau can provide a high-end scanner and can perform demanding retouching and color-correction tasks. The bureau can also work with you to create unusual special effects that you may not have realized were possible.

One service bureau, Scitex (617-275-5150), in Bedford, Massachusetts, now offers conversion of PostScript files, and Aldus promises (through its Open Press Interface, now available only on the Macintosh) to offer links between PageMaker and high-end prepress systems. This means you can produce a full-page layout with a low-resolution color scanner on your own PC in order to show a prepress service bureau how to position and crop an image.

Using your disk files, a prepress service will transfer your layout into the high-end system for final color processing and use a high-end output device to tailor full-page color separations to your specifications. Some services will rescan your original color photograph with a high-end scanner; others have developed proprietary techniques for enhancing low-resolution images during the transfer to the color prepress system. (For instance, it's standard practice among service bureaus to save color PostScript files in .EPS format and then transfer them to a Macintosh to be separated by Adobe Separator.) In any case, you save prepress costs by going as far as you can on your own.

It's equally valuable that prepress service bureaus can serve as liaisons between printers and color trade shops. While they may be equipped to do desktop color page makeup for some jobs, most bureaus also work closely with traditional printers and can offer advice about the most effective ways of mixing the capabilities of desktop systems and other equipment. With the help of prepress service bureaus, you can stay within your budget and get the color results you want.

Sharyn Venit is co-author, with Diane Burns, of Using PageMaker on the IBM *and* Using Ventura Publisher, *both published by the Que Corporation.*

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AT THE GRAND CANYON IN ARIZONA...

AND IN ZURICH, SWITZERLAND...

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PC Magazine's survey about service and reliability confirms what these customers are saying:

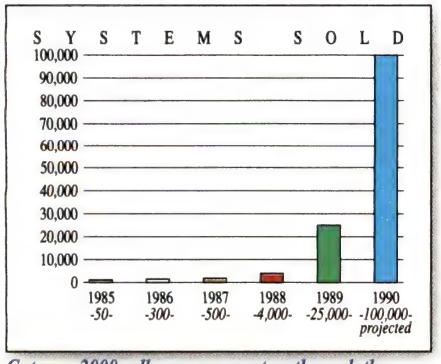
"Gateway shared top billing with such heavyweights as Compaq, IBM, and HP for those who would buy their products again...Overall, Gateway's high marks bode well for the company's future, as does its commitment to customer service."

PC Magazine
September 25, 1990

"In the computer industry, longevity should be measured in dog years."

From the Heartland

The combination of price, quality and service makes Gateway 2000 the best value in the industry. But value alone doesn't explain how a little company in the Midwest, just celebrating its fifth anniversary, managed to outdistance hundreds of other companies, selling more systems through the direct market channel than any other PC manufacturer in the country.



Gateway 2000 sells more computers through the direct market channel than any other PC manufacturer in the country.

"It was the cows," laughed Ted Waitt, Gateway 2000 President and CEO. "Of course." Computer magazine readers will remember the company's early ads featured a picture of the Waitt cattle farm with the headline, "Computers from Iowa?"

"We can't run that ad anymore," continued Ted, grinning, "because we built a new plant 14 miles down the road in South Dakota. But the cows really worked for us. They made the phones ring. From then on, though, we built our business on value – good prices on quality systems with old-fashioned, personal service."

Ted mentioned another reason for Gateway's success. "We take a long-term approach to customer service." he said. "When you buy a computer from Gateway 2000, you become part of our family and we're going to be there for you as long as you own that machine."

As Ted talked about the company's fifth anniversary, he laughed again. "In the computer industry, longevity should be measured in dog years," he chuckled, "because everything's moving so fast. That makes Gateway 35 years old! But seriously, we've come a long way in five years. And I owe it all to the great people at Gateway and to our customers."

Gateway 2000 will be there for you 'til the cows come home.

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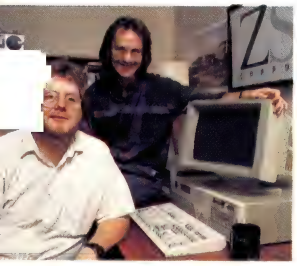
In Atlanta...

ZSoft, the well-known graphics software company, often demonstrates its software at trade shows on Gateway 2000 computers. Dave Steier, ZSoft code librarian and software demonstrator, said he prefers showing products on Gateway systems. "They're terrific," Dave remarked. "I just got back from a show where I was using Gateway 33's and they're screamers." Don Womick, Jr., a programmer for ZSoft, bought a Gateway 2000 20 MHz 386 for his personal use because he liked the Gateway systems at work. "With Gateway," said Don, "I was able to get the performance I need at a price I could afford."



ZSoft employees Dave Steier, left, and Don Womick, Jr., with Don's Gateway 2000 20 MHz 386 system.

Don and Dave both commented on the excellent service they received from Gateway. "Everyone is uniformly polite, friendly and helpful," Dave said.

At the Grand Canyon...

Papillon Grand Canyon Helicopters uses Gateway 2000 computers in its operation. Rick Carrick, chief pilot, started using PC's a few years ago to run point-of-sale software and to perform weight and balance calculations on aircraft, a critical safety and efficiency procedure. Initially he experimented with several computer firms. "I called Gateway because I liked their ads," Rick admitted. "But I've become a loyal customer because their machines are indestructible and they have excellent customer service."

Rick Carrick, Papillon Grand Canyon Helicopters, and his indestructible Gateway 2000 286.

Papillon Helicopters has another Gateway 2000 computer now – a 25 MHz 386 – and Rick said he's in the process of replacing all of the company's PC's with Gateway 2000 systems.

In Zurich...

Michael Paravicini runs a Gateway 2000 33 MHz 386 system. Michael is a management consultant for Price Waterhouse in Zurich. "I was impressed by Gateway's price-features comparison," he remembered. "My system cost far less than you'd expect to pay for a comparable computer." Continuing, he said, "It was also the responsiveness they showed when I sent a fax request for a quotation. Out of ten U. S. companies

Michael Paravicini, Price Waterhouse, and his Gateway 2000 33 MHz 386 system.

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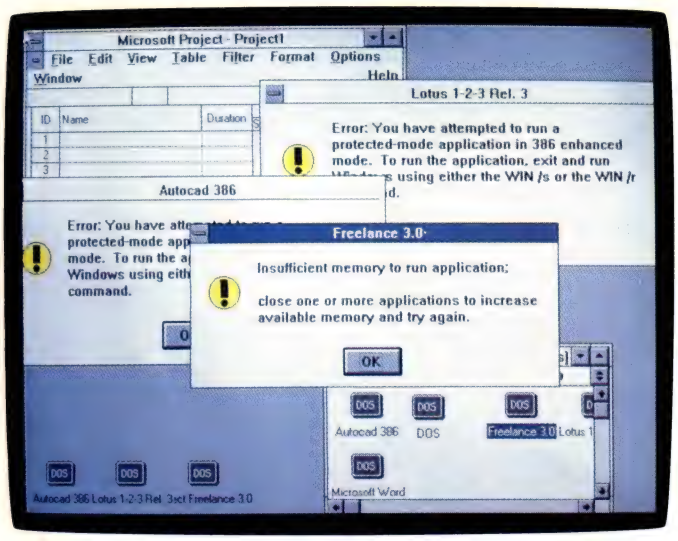
Is Windows 3.0 the nd of DESQview™?

Not if you're still using DOS programs.



Windows 3.0. The multitasking, windowing environment.

DESQview 386 2.3. The multitasking, windowing environment.

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This comparison was made using a system like the one you might run: Both shots show an ALR FlexCache 33/386 running DOS 3.3 *with VGA display adaptor,* Novell NetWare v3.01 Rev. A, with IPX/SPX v3.01 Rev A, Microsoft Mouse 7.00, and Microsoft SMARTDrive v3.03 disk cache. Buffers were set to 20. For the Windows screen, we ran Microsoft Windows 3 HIMEM.SYS and EMM386.SYS. For the DESQview screen, we ran QEMM 386 v5.1.

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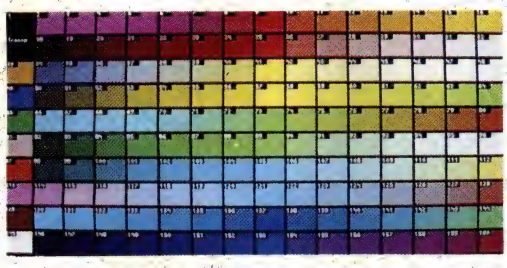

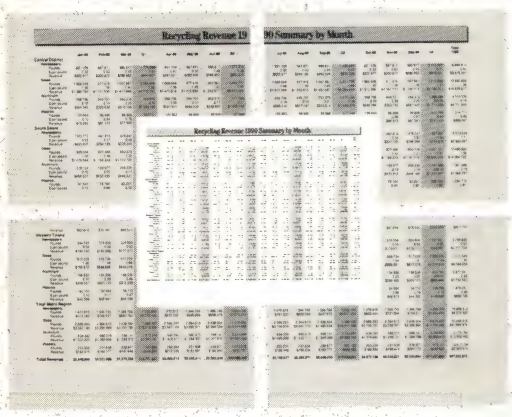

Only Release 3.1 offers an auto-compress feature that quickly reduces larger worksheets so they print on a single page.

Looks like our PR efforts paid off!

Q4 ✓	1989
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1,987,897	5,573,029
1,331,601	3,789,665
5,734,905	**16,249,604**
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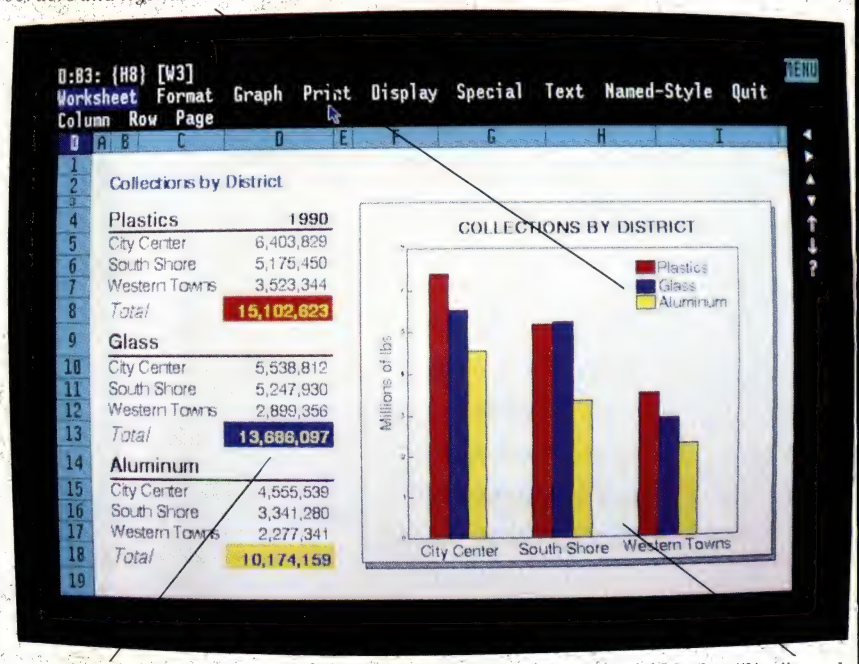
Our Graph Editor lets you add freehand drawings or symbols to call attention to critical data.

Create drop shadows, borders and legends.



Use a mouse or the keyboard. It's up to you.

Combine a variety of colors, type styles and formats.

The WYSIWYG world of Release 3.1, with its Impress technology, means what you see on screen is exactly what you get when you print your work.

Display "live" graphs anywhere on the spreadsheet.

Think Graphically. Think A

Welcome to the world of Lotus 1-2-3 Release 3.1. Where you'll immediately discover the ease-of-use of a graphical environment, complete with mouse support and full WYSIWYG display. In fact, Release 3.1 gives you so many creative options, you'll actually find using it fun.

Of course, you'll also find all the powerful analytical features that have made Lotus 1-2-3 the best-selling spreadsheet in the world. Like our unique 3D technology and access to external databases.

But it doesn't end there. Because Release 3.1 also delivers the most impressive output imaginable. Along with the widest range of spreadsheet f matting options available. Which mea you have complete control over how y want your work to look.

And even more importantly, we've

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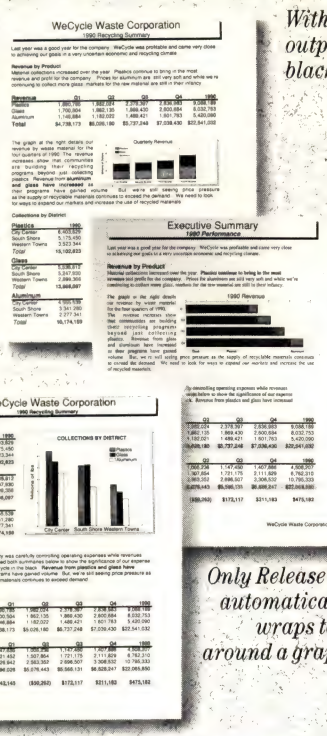


With Release 3.1 your output looks great in black and white.

Choose from 8 combinations of Bitstream® typefaces which you can scale from 3 to 72 points.

Align titles or text – left, right, even or center – with one simple command.

WeCycle Waste Corporation
1990 Recycling Summary

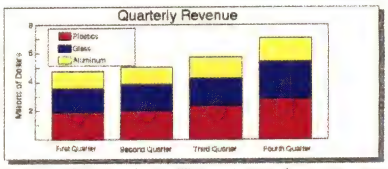
Last year was a good year for the company. WeCycle was profitable and came very close to achieving our goals in a very uncertain economic and recycling climate.

Revenue by Product

Material collections increased over the year. Plastics continue to bring in the most revenue and profit for the company. Prices for aluminum are still very soft and while we're continuing to collect more glass, markets for the raw material are still in their infancy.

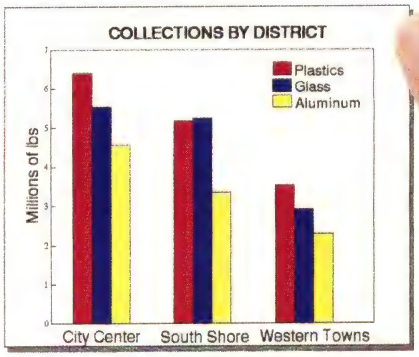
Revenue	Q1	Q2	Q3	Q4	1990
Plastics	1,890,785	1,982,024	2,378,397	2,836,983	9,088,189
Glass	1,700,504	1,862,135	1,869,430	2,600,684	8,032,753
Aluminum	1,146,884	1,182,022	1,489,421	1,601,763	5,420,090
Total	$4,738,173	$5,026,180	$5,737,248	$7,039,430	$22,541,032

The graph at the right details our revenue by waste material for the four quarters of 1990. The revenue increases show that communities are building their recycling programs beyond just collecting plastics. Revenue from **aluminum and glass have increased** as their programs have gained volume. But, we're still seeing price pressure as the supply of recyclable materials continues to exceed the demand. We need to look for ways to expand our markets and increase the use of recycled materials.



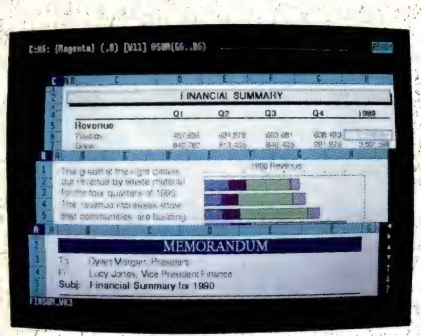
Collections by District

Plastics	1990
City Center	6,403,829
South Shore	5,175,450
Western Towns	3,523,344
Total	15,102,623
Glass	
City Center	5,538,812
South Shore	5,247,930
Western Towns	2,899,356
Total	13,686,097
Aluminum	
City Center	4,555,539
South Shore	3,341,280
Western Towns	2,277,341
Total	10,174,159



Only Release 3.1 automatically wraps text around a graph.

Release 3.1 runs in Windows 3.0. Just click the icon and you're on your way.



Our unique 3D technology. It's the best way to organize your work, link files, consolidate data, or create multi-page reports.

Mix bold, italics, underlines, colors and typefaces to create over 100 text style combinations – more than any other spreadsheet.

Over 200 graph style combinations that you can size and enhance. You can even display more than one graph per page.

alytically. Think Confidently.

designed Release 3.1 for PCs running either DOS or DOS with Windows™ 3.0.

Plus, when you purchase Release 3.1, you can count on the best and most comprehensive support in the business. Including six months of 24-hour, 7 days a week, toll-free help.*

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Lotus 1-2-3◆3.1

Call 1-800-TRADE UP, ext. 989, for upgrade information or for a free Release 3.1 demo disk. And be confident that you're buying the best spreadsheet in the world.

Introducing Lotus 1-2-3 **3.1**

*24-hour support available in U.S. only.

YOU ALWAYS KNEW THERE WAS SOMETHING SPECIAL ABOUT YOUR THUMB.

PC MAGAZINE
EDITORS' CHOICE
August 1990
TrackMan Stationary Mouse

You have a lot of power in your thumb. So we designed TrackMan™—the world's most popular stationary mouse—to put that power to work. TrackMan's brilliant ergonomic design includes a lightweight, thumb-driven ball, three buttons at your fingertips and room to rest your hand. It is far more comfortable than any other stationary mouse. Because the thumb is far more agile and powerful than any finger. With TrackMan's adjustable resolution, you command the cursor with exhilarating speed and precision, even in the most confining workspace. And you get all this for only $139, including Logitech's™ lifetime hardware warranty. TrackMan works with any application on an IBM® PC (or compatible). For more information call Logitech's Customer Sales Center: (800) 231-7717 ext. 317. In California: (800) 552-8885; in Canada: (800) 283-7717; in Europe: ++41-21-869-9656.

LOGITECH

Tools That Power The Desktop.

CIRCLE NO. 193 ON READER SERVICE CARD.

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By Kathleen Richards

PC Gifts for All Seasons

Sure, you'll want to put these goodies under the tree. But they'll make computing a holiday anytime—at the office, on the road and in the home.

IT'S CUSTOMARY at this time of year for magazines to present an array of curious or creative gifts aimed at "the person who has everything."

But we know the truth, don't we?

We know that the true PC maven—however well off, however well-supplied with micro goodies, however clever in squeezing every last ounce of performance from every product—never has *every*thing.

So we offer instead a tantalizing spread of wonders for the PC savant who has plenty ... and still wants lots more.

We put the exquisite tastes of our staff to work to find gifts of class, style and intelligence. How did we choose, you may ask? Our method was simple. Figuring we're as PC-mad as most of our readers, we simply selected those products we craved most ardently for our offices, for our excursions on the road and for our hearths.

So sit back, take a swig of hot cider and feast your eyes on products that we'd love to buy for ourselves (but secretly hope our loved ones will buy for us first).

For the Office

1. Give the power user in your life the Arnold Schwarzenegger of PCs—the **Compaq Deskpro 486/ Model 650**. It'll pump him up. $17,999 from Compaq Computer Corp., (800) 231-0900, (713) 370-0670.

2-3. Sharpen your friends' competitive edge with **Crosstalk Mk.4 Version 2.0** ($245 from Digital Communications Associates Inc., 404-442-4000) and **Dow Jones News/Retrieval** ($29.95 plus online time charges, from Dow Jones & Co. Inc., 800-522-3567).

4. It's not sexy, but a holiday gift of the data-rescuing **Norton Utilities 5.0** could save your PC chestnuts from being roasted. $179 from Symantec Corp., (408) 253-9600.

5. Bring joy to Windows users with hDC's **FirstApps for Windows.** The nine pop-up utilities include a calendar, a screen saver, a memory viewer and assorted animated background "wallpapers." $99.95 from hDC Computer Corp., (800) 321-4606, (206) 885-5550.

6. Get instant access to a year's worth of news from top computer publications (including *PC/Computing*) with a **subscription to the Ziff-Davis Computer Library.** One-year subscription, upgraded monthly, $765 from Ziff Communications Co., (212) 503-4400.

7. **The Public (software) Library** may sound like the kind of outfit that begs for money by phone, but *PsL News* offers the largest collection of shareware around. $18 per year from The Public (software) Library, (800) 242-4775, (713) 524-6394.

8. The **Glass Top Ergonomic Computer Desk** positions your monitor under a glass window and your keyboard in a slide-out drawer so that your desktop remains crystal clear. $399.95 from Reliable Home Office, (800) 869-6000.

9-10. Proxima's **512 Versa Color II LCD** projection panel and **Cyclops pointer** give you complete control over PC or Mac presentations—without making you run to your desk every time you want to move the mouse. Projection panel ($4,795) and Cyclops pointer (price not set) from Proxima By Computer Accessories Inc., (800) 582-2580.

11. "I can't believe it's instant," you'll say when you try the plug-in 105MB **Hardcard II XL 105**. $999 from Plus Development Corp., (408) 434-6900.

12. Take out a personalized subscription to **Burrelle's News Express Clipping Service,** and each day you'll receive faxes of clips from 43 top daily newspapers on any seven subjects you select. $1,750 per month from Burrelle's, (800) 631-1160, (201) 992-6600.

13. Adorn your walls with a print of the **Intel 386 microprocessor** from the Museum of Modern Art's **Diagramming the Microchip** exhibit. Item No. 4572, $13.50 from the Museum of Modern Art, (800) 447-6662.

1. Give your Road Warrior a **GRiD 1550SX laptop** with a built-in Isopoint mouse pointing device. This is the only laptop specially designed for Windows users. $6,295 from GRiD Systems Corp., (800) 222-4743, (415) 656-4700.

2. A gift certificate for **lunch at The Lion & Compass** in Santa Clara, California, lets you "eat with the elite" in the heart of Silicon Valley. The food's good, the crowd's better. $40 (lunch) and $80 (dinner) from The Lion & Compass, (408) 745-1260.

3. The **BJ-10e Bubble Jet Printer** offers first-class printing and fits in a briefcase. $499 from Canon USA Inc., (516) 488-6700.

4. Talk all day from the North Pole if you like with the amazingly portable and lightweight (10.7 ounces) **MicroTAC Personal Telephone**, perfect for communicating on the road. $2,495 from Motorola Inc., (800) 331-6456, (708) 397-5000.

5. Set someone loose in **47th St. Photo**, an electronics junkie's pipe dream. Gift certificates for any amount are available from 47th St., (800) 221-7774, (212) 608-8080.

6. The best thing since Dick Tracy, the **Motorola Wrist Watch Pager** is designed for international use and works with two primary paging codes (GSC and POCSAG). $300 ($15 to $30 monthly fee, depending on location) from Motorola Inc., (800) 247-2346.

7. For those in high-tech overdrive, the **Hypertech Power Chip** retunes a car's engine for high-performance driving. Chips are available for Porsches, BMWs and Corvettes, among others. $150 to $249 from Hypertech Inc., (901) 382-8888.

8. Any laptop user will appreciate **Eye Relief**, Ken Skier's word processing answer to eyestrain. $129.95 from SkiSoft Inc., (800) 662-3622, (617) 863-1876.

9. Keep close tabs on the NYSE with **FNN QuoTrek**, a real-time stock information service. $495 ($80 to $100 monthly fee) from FNN Data Broadcasting, (800) 367-4670.

Photographs by Hornick/Rivlin Studio
Styling by Diane Gilbert/TEAM
Miniature furniture courtesy of Lucille's Little House
Road miniatures courtesy of Eric Fuchs Hobbies

For the Home

1. You'll never want to leave the house again once you power up the **Ultimate Multimedia Center**. Start with a VGA-equipped 386 PC, then mix and match these eye (and ear) poppers:

2. Turn video faves into PC pixels with the **DVA-4000 full-motion digital video adapter**. It runs any video on your PC. $2,495 from VideoLogic Inc., (617) 494-0530.

3. Turn on and tune in your PC with a **LAN-1001 cable-ready TV tuner board**. You can dial the soaps under DOS. $998 from ISS Engineering Inc., (800) 227-6288.

4. Pump up the volume by adding a **LAPC-1 Sound Module Card** ($595) and **MA-12C Micro Monitor speakers** ($290 per pair). Roland Corp., (213) 685-5141.

5. But keep the neighbors happy with **Koss JCK/300 cordless headphones**. $274.95 from Koss Corp., (800) USA-KOSS, (414) 964-5000.

6. Plug in **Pioneer's DRM-600 six-disc CD-ROM changer** and let the games begin. $1,389 (with installation kit) from Pioneer Communications of America Inc., (201) 327-6400.

7. Or experience interactive video or crystal-clear movies with the **Pioneer LD-V8000 videodisc player**. $2,280 from Pioneer, (201) 327-6400.

8. And don't forget your discs: **The Oxford English Dictionary** on CD-ROM ($940 from the Bureau of Electronic Publishing, 800 828-4766)

and laserdiscs of **sex, lies, and videotape** and **The National Gallery of Art** ($124.95 and $95, respectively, from The Voyager Company, 800-446-2001).

9. Tell your kids this is what kindergartners do in Japan when you hand over the **Intel 486 Microprocessor Jigsaw Puzzle.** Item No. 1672, $13 from the Museum of Modern Art, (800) 447-6662.

10. Save your inheritance! Give the keeper of the family fortune **Quicken 4**, the personal finance program that now incorporates CheckFree, an electronic bill-paying service. $59.95 from Intuit Inc., (800) 624-8742, (415) 322-0573.

11. **Personalized Windows Wallpaper** lets you send any color photograph, up to 5 by 7 inches, and receive a BMP file that can fill a screen or be tiled. $25 from Wilson WindowWare, (800) 762-8383.

12. Know someone who wants to run the place? **SimCity** lets armchair Ed Koches make the decisions about their very own Gotham. $49.95 from Maxis/Broderbund, (800) 521-6263, (415) 376-6434.

13. Order a **Nancy Burson Composite PC Portrait** that blends photographs of all your honey's former loves into one. *You'll* look better than ever. $5,000 from Face Software Inc., (212) 226-2457.

14. Sit pretty at a new desk. The 38-inch-long **ScanCo/2 Table** is built for PC users. Model No. ST3800, $339 from Scandinavian Computer Furniture Inc., (800) 722-6263.

TWO REASONS WHY TOSHIBA SELL

At Toshiba, we think that designing a portable computer to fit real live human beings can make the difference between a computer you love and a computer you merely tolerate.

So that's exactly what we think about when we design our portable PCs.

Chances are, you're already used to our comfortable, full-function keyboard. That's because the keys are the exact size and shape you expect them to be.

And the public has told us we were right in our thinking. In fact, according to PC Magazine, Toshiba portables rank number one in customer satisfaction.

Take our T1200XE notebook PC, for example. You'll notice how our unique screen technology makes it easy to read under virtually all lighting conditions, no matter where you decide to get your work done.

The T1200XE takes up about one square foot of desk space (or lap space) so there's always room to work.

For a free brochure or the name of your nearest Toshiba dealer, call 1-800-457-7777.

Sales results based on worldwide installed base of lap tops, per 1989 Dataquest Inc. study. Customer satisfaction results based on PC Magazine, 9/25/90 issue.

MORE PORTABLES THAN ANYONE ELSE.

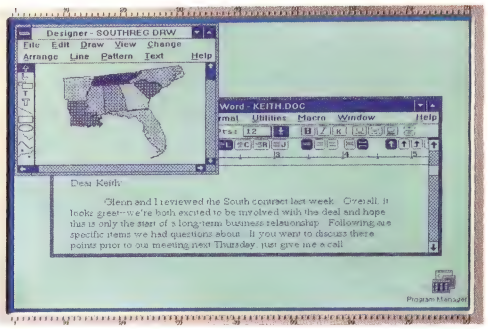
Next, you'll find the keyboard to be immediately familiar, since it's what you're already used to. All of the key spacing and sizes are standard.

You'll also discover plenty of processing power packed into the 286-based T1200XE. And the 20MB hard drive means you can keep all your programs and files right where you need them. With you.

Plus, you'll undoubtedly appreciate the T1200XE's other humane features like a slim line battery pack and AutoResume,™ which lets you pick up exactly where you left off. No grand reopening of the system, program and file every time you want to start work again.

The only thing you'll notice we've skimped on is size and weight. After all, what good is a portable if you can't take it with you?

With notebooks like the T1200XE it should come as no surprise that Toshiba sells more portable PCs than any other company in the world. After all, you're not the only one who recognizes a good thing when they see it.



Toshiba designed the large, easy-to-read display with real, live humans in mind. So now you can work without a lot of eyestrain, neckstrain or backstrain.

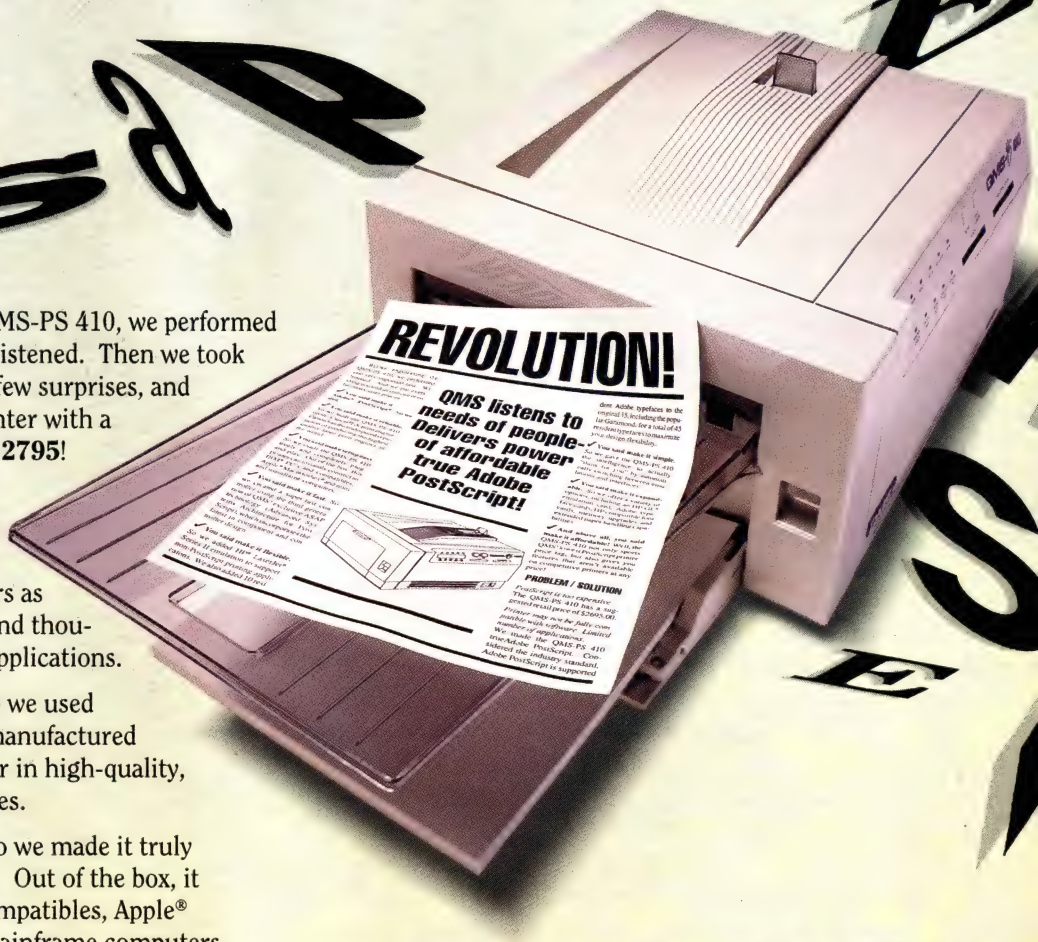
In Touch with Tomorrow

TOSHIBA

CIRCLE NO. 222 ON READER SERVICE CARD.

PostScript Power To The People!

The QMS-PS® 410 Printer. Developed by the greatest minds in the industry. . . Yours.



Before engineering the QMS-PS 410, we performed one very important task. We listened. Then we took everything we heard, added a few surprises, and built a revolutionary laser printer with a suggested retail price of just **$2795**!

You said make it Adobe® PostScript®. So we did. And now you can enjoy the design flexibility only PostScript offers as well as 45 resident typefaces and thousands of PostScript software applications.

You said make it reliable. So we used the Canon® LX print engine manufactured by the undisputed world leader in high-quality, easy-maintenance print engines.

You said make setup easy. So we made it truly and completely plug-and-play. Out of the box, it connects to IBM® PC's and compatibles, Apple® Macintoshes® and mini and mainframe computers.

You said make it flexible. So we added HP® LaserJet® Series II emulation to support non-PostScript printing applications.

You said make it simple. So we gave the QMS-PS 410 the intelligence to actually "think for you" by automatically switching between emulations and interfaces! This printer has ESP (Emulation Sensing Processor), which interprets incoming data and *automatically* chooses the appropriate printer language. And you can send data *simultaneously* to its AppleTalk®, serial and parallel interfaces! There's no need to change switch settings or send complicated software commands.

You said make it fast. So we created a super-fast controller with a 68020 processor and third generation QMS® ASAP™ technology (Advanced Systems Architecture for PostScript), which incorporates the latest in component and controller design.

You said make it expandable. So we made a variety of options available, including an HP-GL® emulation card, Adobe typeface cards, HP compatible font cards, memory upgrades and extended paper handling capabilities.

Call Now and Let the QMS-PS 410 Liberate You!

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You see, listening to you gave us the insight to develop a printer that offers real world solutions to real world problems. And the QMS-PS 410 delivers PostScript power to the people by giving you more solutions than any other printer on the market. Affordable. Reliable. Flexible. Solutions that set you free!

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CIRCLE NO. 215 ON READER SERVICE CARD.

Better Batching With [WINDOWS]

BatchWorks and Bridge Tool Kit bring the power of batch files to the Windows environment.

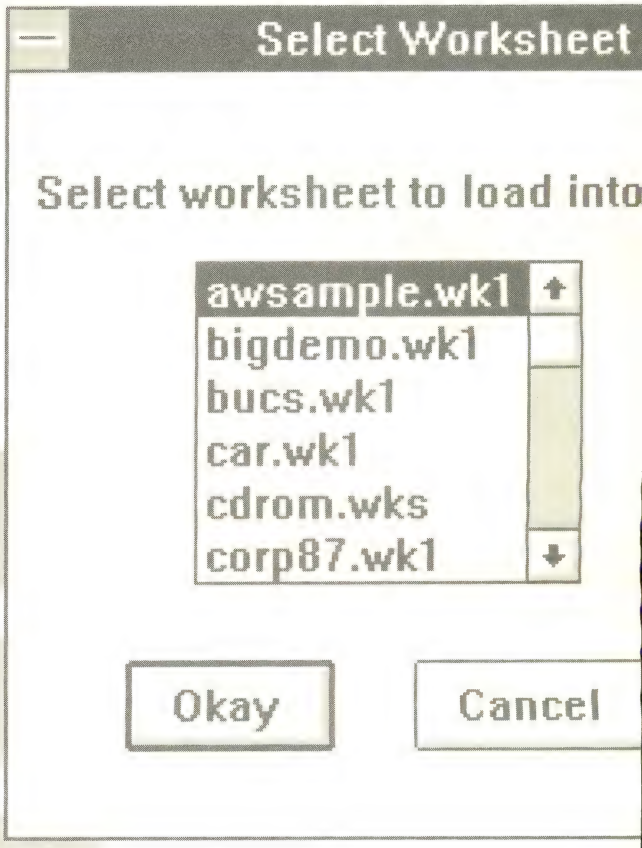
MILLIONS OF PC users take advantage of batch files to launch programs and set up their systems in the DOS environment. Once you've learned the basics of batch programming, it takes you no more than a few seconds to build a simple menu or write a routine to change your system configuration.

Although Windows offers plenty of opportunities for similar quick-and-dirty programming jobs (as well as more complex procedures involving data exchanges between applications), Microsoft didn't arm Windows with the batch-language capability to get the job done.

Fortunately, other developers picked up where Microsoft left off. If you're looking for a systemwide command language for Windows 3.0, you'll find two good candidates: PubTech BatchWorks, from Publishing Technologies, and Bridge Tool Kit, from Softbridge Inc.

BatchWorks and Bridge share the simple syntax of DOS's batch language and can be applied to the same kinds of tasks. You can use them to build files that supplement Program Manager with a menu of all your applications, to launch applications with shortcut keys or to create simple Windows front ends for your favorite DOS utilities.

And that's just the beginning. BatchWorks and Bridge can also handle more complex jobs. They are both powerful languages in their own right, able to control and interact with other applications. With these products and a little know-how, you'll be able to develop anything from



BY PAUL BONNER

custom menuing systems to integrated programs that link several off-the-shelf applications and automate business activities.

If you like working with DOS's batch language, you'll love BatchWorks and Bridge. Even if you've never tried DOS's language, you should look at these packages. They're the most powerful tools available for taking control of the Windows environment.

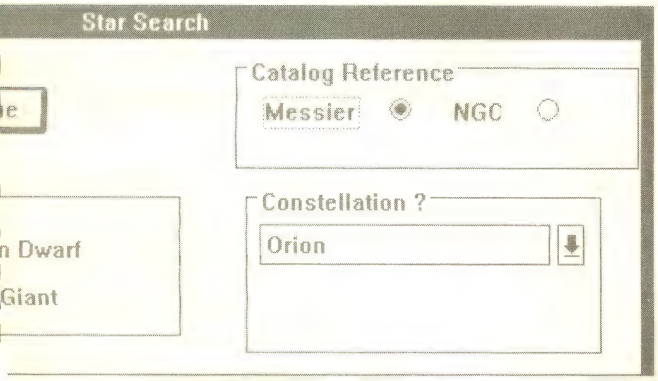
Although the capabilities of the two packages overlap considerably, the $99.95 PubTech BatchWorks is best suited for quick utility programming jobs, while the $695 Bridge Tool Kit is most useful for more complex systems integration projects.

PUBTECH BATCHWORKS

Programs written in BatchWorks fall into two broad categories: macros, which generally act upon a specific application, and batch programs, which either function independently or interact with other applications.

Macros let you customize your applications, shaping them and adding new functions to them so that they work more to your liking. For instance, consider Notepad, the handy, bare-bones text editor bundled with Windows. BatchWorks macros let you customize Notepad so that when you select File Open, a *.* list pops up rather than the default *.TXT list. Or write a macro that adds sections of boilerplate text to Notepad's Control menu so that selecting a menu item called Disclaimer pastes a standard disclaimer statement into a document. Or use the following code to add a Replace function to Notepad's Search facility:

```
:REPLACE
   a=ASKLINE("Search & Replace", "Search for:","")
   b=ASKLINE("Search & Replace", "Replace with:","")
   WINACTIVATE("Notepad")
   SENDKEY("!SF%a%{ENTER}")
   SENDKEY("%b%")
   EXIT
```



This routine, identified with the label :REPLACE, makes double use of ASKLINE, a BatchWorks command that creates a small dialog box and asks the user for a single line of input. The first instance of ASKLINE obtains the string for which the routine should search and assigns it to variable *a*, while the second obtains the replacement string and assigns it to variable *b*. Then the routine springs into action: First it activates the Notepad window. Then it sends keystrokes that tell Notepad to search for the first instance of string *a* (! is equivalent to the Alt key; Alt-SF causes Notepad to highlight the string once it's found). Finally, it sends string *b* to replace the highlighted string.

ASKLINE is one of BatchWorks' three one-line commands that summon simple dialog boxes. The other two commands, MESSAGE and ASKYESNO, are used to relay information to the user or to obtain a simple yes-or-no response, as follows:

```
MESSAGE("Not Found", "The search string could not be
    located!")

ASKYESNO("End of File", "Continue search from top of
    file?")
```

The first command displays "The search string could not be located!" followed by an "OK" button in a dialog box labeled "Not Found," while the second displays "Continue search from top of file?" followed by "Yes," "No" and "Cancel" buttons in a dialog box titled "End of File."

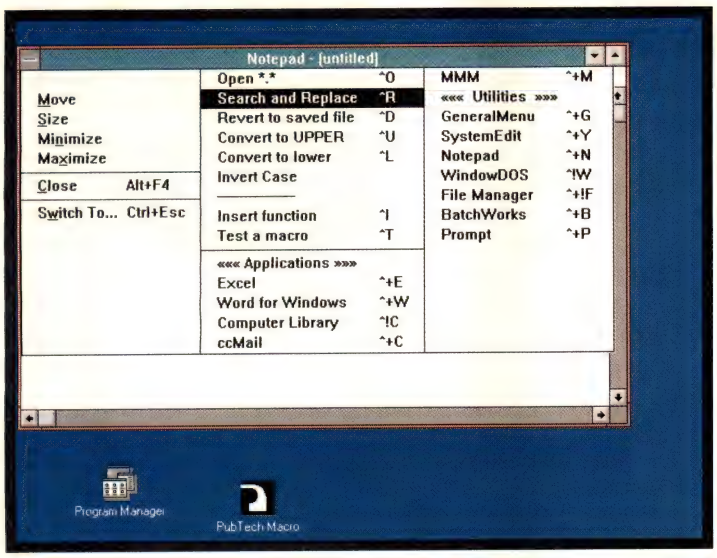
Be a Box Builder

The ability to create simple dialog boxes with a single command makes it easy to develop programs quickly with BatchWorks, but it takes only a little more effort to make more complex dialog boxes. For instance, you can build a more comprehensive search-and-replace macro by constructing a dialog box with options for variables such as the direction of the search and whether the routine should automatically replace every instance of the search string or first query the user.

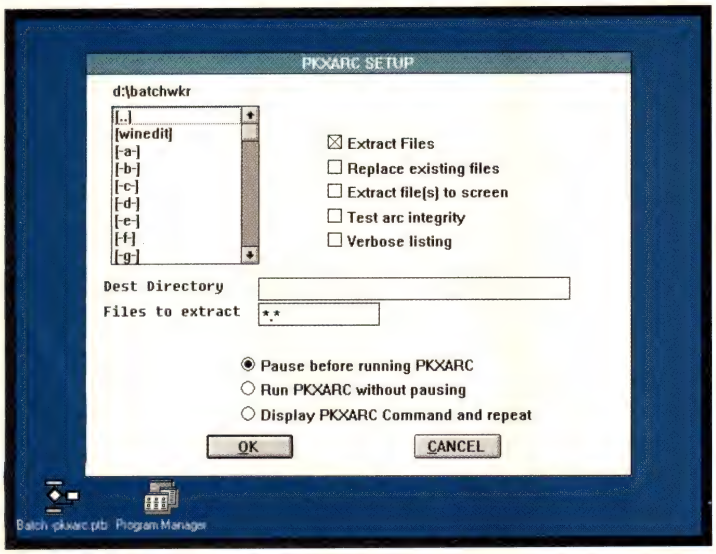
To build a custom dialog box, you must first create a dialog box template file in an ASCII editor such as Notepad. Then call the template from your BatchWorks program. The template file for the Search and Replace dialog box looks something like this:

```
Replace: [#a                    ]
With:    [#b                    ]
Replace: [^c1Query first] [^c2Replace all]
Search:  [^d1Forward] [^d2Reverse] [^d3From top]
```

This template will create a dialog box with two editable text fields (each denoted by the # character) labeled "Replace:" and "With:". Also, two sets of check boxes (each box denoted by the ^ character) will appear, one to indicate whether the routine should query the user before replacing the search string or replace all occur-



A macro written in BatchWorks can add a Replace function to the Search facility in Windows' Notepad.



This front end for PKXARC, which offers files and options in a dialog box, is included with BatchWorks.

rences of the string at once, and the second set to indicate the direction of the search (forward, backward or from the top of the file). The search string will be assigned to variable *a*, the replacement string to *b*, the results of the first set of checkboxes to *c* and those of the second set to *d*.

To use this dialog box template, you save it under the name, say, REPLACE.DLG, and then include a command such as:

```
DIALOGBOX("Search and Replace","replace.dlg")
```

in your script, telling BatchWorks to draw the dialog box and put "Search and Replace" on its title bar.

Once you've drawn the dialog box, you have to write code so that the macro responds to the user's check box selections. For instance, if the user selects the From Top box, the macro must issue the following Ctrl-Home command:

```
SENDKEY("^{HOME}")
```

which moves the cursor to the top of the Notepad file before starting the search for string *a*.

BatchWorks' process for creating dialog boxes is clumsy compared with the Wysiwyg dialog box editors that are included in many Windows programming tools (including Bridge Tool Kit). Moreover, it provides only limited control over the placement of dialog box elements, and it supports only a subset of Windows' user-interface controls: list boxes, editable text fields, radio buttons and check boxes. Still, BatchWorks has the virtue of being simple and fast. Once you have mastered the syntax of the templates, you can build new dialog boxes almost instantly.

In addition to creating dialog boxes to pop up over other Windows applications, BatchWorks macros can interact with those applications by typing text into them and by manipulating their screen windows. The commands

```
WINACTIVATE("Microsoft Word")
SENDKEY("Sample text")
SENDKEY("!FS")
WINICONIZE("Microsoft Word")
```

will perform the following tasks, respectively: 1) activate Word for Windows; 2) type the words *Sample text* into the current document; 3) save the file (Alt-FS is Word for Windows' keyboard command for File Save); and 4) iconize the Word for Windows window.

The BatchWorks language also has several Clipboard-oriented commands: CLIPPUT to copy a string to the Clipboard, CLIPGET to copy the contents of the Clipboard to a string and CLIPAPPEND to append a string to the Clipboard's current contents. These are useful for moving large blocks of data between applications faster than is possible with the SENDKEY command.

BatchWorks does not include DDE (Dynamic Data Exchange) commands, although it can automate the initiation of DDE links between programs that do support DDE. Nor does it have the ability to pass commands or keystrokes to non-Windows applications once they're running (except through the Clipboard). However, you can use its standard program-launching commands to launch non-Windows applications and pass filenames or other command-line parameters to them, making it especially useful for building front ends to DOS command-

line utilities that require no user input once they have been initiated.

Beside these Windows-oriented commands, BatchWorks supports a set of string, math, statistical and file-control functions roughly equivalent to those found in BASIC, and it has a limited but functional set of flow-control commands: GOTOs, IF-THEN loops and EXECUTE and CALL statements. It doesn't offer direct support for variable arrays, but its variable-substitution capabilities are so flexible, you can work around that quite easily. In fact, you can use a variable name almost anywhere in a BatchWorks script—even in the middle of a text string to be displayed or as the address in a GOTO statement. That capability, as well as BatchWorks' willingness to convert string variables to integer variables and vice versa, makes it an extremely friendly environment for quick-and-dirty program development. (Whether the resulting code is as suitable for long-term projects, where decipherability is a concern, is open to question.)

BatchWorks doesn't have a program editor, but you can use any ASCII editor to compose your programs. It does include a pair of useful programming aids: a debugger that steps through the execution of a program and displays the current value of any variable, and a macro recorder. The BatchWorks macro recorder differs from the one included with Windows in two important respects: it records only keystrokes rather than keystrokes and mouse actions, and the macro files that it records can be edited. Thus, you can use it to capture an involved sequence of keyboard commands, then use that sequence as the basis of a BatchWorks program, adding dialog boxes and messages as necessary.

To use the BatchWorks macro recorder with an application, you must have the macro interpreter PT Macro in memory and you must define a list of the macros for that application and their keyboard shortcut keys in a text file, saved under the same name as the application's executable file but with a .PDF extension. (Thus, the macro definition file for NOTEPAD.EXE would be NOTEPAD.PDF.)

Once you've done so, PT Macro will add a list of available macros to the application's Control menu (the menu used to resize or close an application, activated by the square box in the upper left corner). PT Macro will watch what you type as you work within the application, to see if you use a keyboard shortcut to execute one of the macros. Any of the macros can be launched either by selecting it from the Control menu or by pressing its shortcut key combination.

In addition to application-specific macros, PT Macro lets you create a file called GLOBAL.PDF that lists macros or batch programs you want to be available from within any application. Macros and programs in GLOBAL.PDF will appear on the Control menu of every Windows application (and every DOS application running in a 386 Enhanced mode window), alongside any application-specific macros you've defined.

One handy way to use GLOBAL.PDF is as a program launcher for your favorite applications. If you often use Amí Professional, SuperBase IV and Crosstalk for Windows, for example, you can add three macros that launch those programs to GLOBAL.PDF and assign shortcut keys to each one. Then, whenever you select the SuperBase menu item or press the program's shortcut key, BatchWorks launches SuperBase.

If you've defined both GLOBAL.PDF macros and NOTEPAD.PDF macros, for example, selecting the Control menu in Notepad brings down a list of Notepad-specific macros (such as the Replace function listed above) followed by a list of global macros, such as instructions to launch File Manager or Paintbrush, while pressing any of the shortcut keys you've defined will execute a macro from either NOTEPAD.PDF or GLOBAL.PDF.

Whip Up a Batch

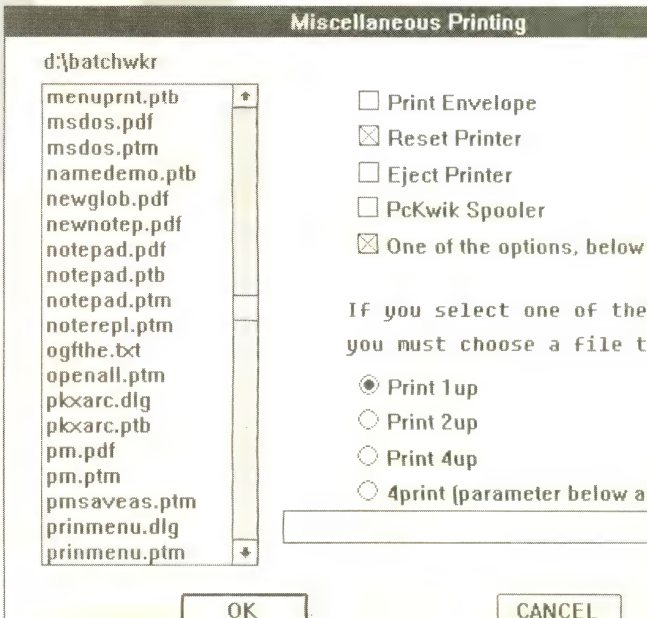
So far we've talked almost exclusively about BatchWorks macros. Batch programs, the other kind of routine you can build, have similar capabilities and use the same programming commands as macros, but they can run independently of a specific application.

Because batch programs are not application-specific, you can use them anytime for tasks ranging from launching an application (by a command such as RUN("AmiPro","")) to building menus of applications or launching sets of applications (for instance, launching the "Desktop Publishing Set" would load PageMaker and Corel Draw).

Batch files can also be used to build Windows front ends for DOS applications. One example is a front end included with BatchWorks for PKXARC, a file-decompression utility that's usually run from the DOS command line, using a string of parameters such as:

```
PKXARC -e- r DOWNLOAD.ARC c:\unarc\files\*.*
```

The PKXARC front end replaces the DOS command line with a Windows dialog box from which you can choose an



ARCed file and the options you wish to activate. Once you've indicated your choice, it constructs the command line and passes it to PKXARC.

In addition, batch programs can be used to build small standalone programs. For instance, you can build a simple file backup program to copy all your document files to a backup disk at 6 p.m. every day.

All in all, BatchWorks delivers a lot of functionality for $99.95. You may find that it supplies all the features you'll ever need from a Windows batch language. As your programming projects get more complex, though, sooner or later you may run up against BatchWorks' limitations. Maybe you'll need more versatile dialog boxes or integral support for DDE, or the ability to send keystrokes to DOS applications. When that time comes, you're ready for Bridge Tool Kit.

PubTech BatchWorks *List Price:* $99.95. Publishing Technologies Inc., 7719 Wood Hollow Drive, Suite 260, Austin, Texas 78731; (800) PUBTECH, (512) 346-2835.

BRIDGE TOOL KIT

At $695, Bridge Tool Kit doesn't have quite the "bargain" feel that BatchWorks does. But if you're looking for a full-powered systems integration tool to build customized workstations or automate complex processes, Bridge's extra power is well worth the cost.

While BatchWorks primarily helps you work with individual applications, Bridge Tool Kit is more concerned with linking multiple applications. Much of the program's focus is on communications: between you and your applications, between Windows applications, between Windows and DOS applications and between applications over a network.

Like BatchWorks, the Bridge language echoes the syntax and command structure of DOS's batch language. But it goes beyond DOS's limits, including more powerful program control functions, such as GOSUBs and WHILE loops, as well as an extensive set of array-handling commands.

Bridge is also much more flexible than BatchWorks at building full-fledged Windows interfaces for your applications. You can create cascading drop-down menus for the Bridge window, which in turn can launch programs or initiate command sequences. A menu item labeled "Excel" can simply launch Excel, while another one labeled "Consolidate Regional Sales" can initiate a process whereby sales figures from six regional worksheets are consolidated into a new Excel worksheet. Meanwhile, you can include all your applications on menus in the Bridge window titled "My Workstation" and make that your primary control center for Windows.

Bridge's menus work only in the Bridge window; you can't add items to another application's control menu as in BatchWorks. Even so, you can create both application-specific and global hotkey commands using Bridge's ON KEY command. For instance, the commands

```
SELECT write; ON KEY %%i GOSUB insertboiler
SELECT windows; ON KEY %%c GOSUB closeall
```

could (assuming that the routines "insertboiler" and "closeall" exist) insert a boilerplate paragraph into Write when Alt-I is pressed and close all open windows when Alt-C is pressed.

Bridge also includes a batch file editor with such features as auto-indent, the ability to paste commands and functions from a scrolling list into your script and an integral Dialog Editor, which acts like a macro recorder as you draw the dialog box you want onscreen.

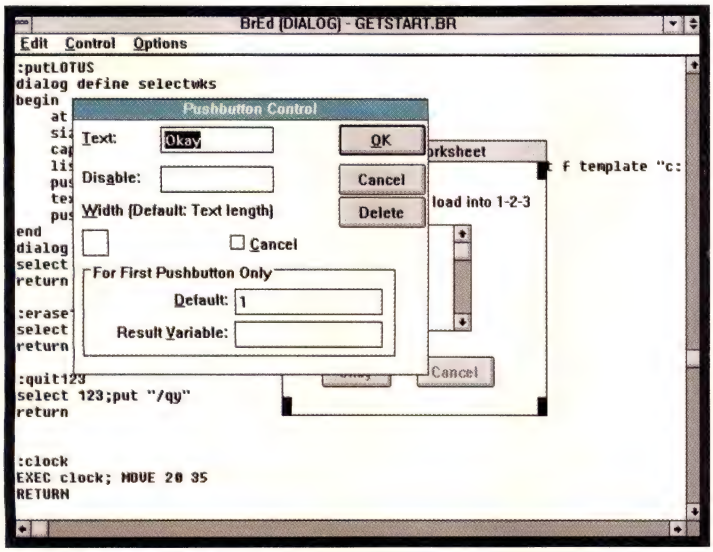
With the Dialog Editor, you can create dialog boxes using the full range of Windows 3.0 user-interface controls, including editable text boxes, combo boxes (with lists as well as editable text fields), list boxes, radio buttons and check boxes, text messages, icon buttons, group boxes, bitmaps and pushbuttons. You can size any box and position it where you want it onscreen, then select the controls that you want to include from the Dialog Editor's menu and place them exactly where you want them to appear in the box.

Once you're finished, select the Dialog Editor's Save command to paste the commands necessary to create the dialog box into the Bridge batch editor. This reduces the attractive box you've just drawn to a string of commands such as:

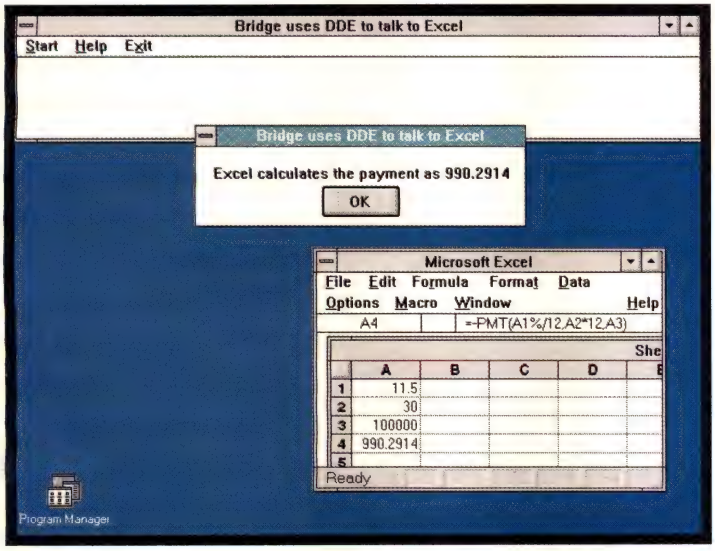
```
DIALOG DEFINE SELECTWKS
BEGIN
   AT 26 44
   SIZE 94 89
   CAPTION "Select Worksheet"
   LISTBOX AT 14 6 LINES 6 WIDTH 12 SORTED REQUIRED Y
      RESULT F TEMPLATE "c:\123\*.wk?"
   PUSHBUTTON AT 26 64 DEFAULT 1 "Okay"
END
```

Two aspects of this process are noteworthy. Pasting the dialog box into your batch program is a two-way street: If you want to tinker further with the dialog box, you can select it and use the batch editor's Edit Dialog command to load it back into the Dialog Editor. And if you're using Bridge for prototyping work, you can save finished dialog boxes in Windows SDK (Software Development Kit) format for use in compiled C programs. This precise control of dialog-box design lets you give applications a professional look, as dialog boxes are the primary means of communication with Windows program users.

Bridge's dialog boxes are as powerful as they are attractive, thanks to the language's Dialog Validate command. This allows you to evaluate the results of a dialog box before it is erased from the screen. For instance, you might compare what the user has entered with a list of acceptable inputs. If the result is invalid, your Bridge program can produce a second dialog box describing the error and then refresh the original box, positioning the cursor at the error.



Bridge Tool Kit's Dialog Editor records the necessary script commands (in the background) as you create a dialog box.



Bridge can use Dynamic Data Exchange to send data to Excel and receive completed calculations from it.

Of course, this versatility comes at a price. As simple as the Dialog Editor is to use, Bridge gives you no way to create an instant dialog box like those built by BatchWorks' one-line ASKYESNO or MESSAGE commands. You have to use the Dialog Editor to build even the simplest box or user message.

Two other amenities for programmers are a trace mode, in which all Bridge commands and messages are echoed to the Bridge window or to a file or printer, and a Browser that lets you examine the current values of any variable or open window. You can even change the values of variables from within the Browser, making it a powerful debugging tool.

One amenity that Bridge doesn't supply is a macro or batch recorder, an oversight that seems especially silly, since SoftBridge wrote the Recorder that's included with Windows. Moreover, you can't even import Recorder macros (not even the keystroke portion) into Bridge.

Dynamic Conversations

Like BatchWorks, Bridge gives you a great deal of control over other Windows applications. You can launch programs, retitle their windows, move them around on the screen, hide their windows, minimize and maximize them and type text or commands into them. But Bridge goes further, providing powerful mechanisms for interprocess communication.

The most familiar of these is DDE. Bridge includes extensive support for DDE communications, with the ability to act either as a DDE requestor (the initiator of a "DDE conversation") or a server (the second party in the conversation who responds to the initiator's requests) or as both in multiple conversations.

Bridge can hold DDE conversations only with other applications that support DDE, among which there has been little standardization. Therefore, to take advantage of Bridge's DDE commands you must learn both their syntax and the manner and style in which the other application has implemented the DDE protocol.

Nevertheless, once established, a DDE channel is a powerful tool that allows two-way exchange of data between active applications. The difference between such an exchange and simply typing text into another application is like that between writing a letter and talking on the phone. Using DDE, Bridge can send an application a chunk of data and instructions on how to process it and then request that the application send back the result. A Bridge program designed to automate a monthly report could use DDE to extract spreadsheet data from Excel and corporate financial data from a remote mainframe, then pump all the data through a DDE link into a Word for Windows table and finally use DDE to tell Word for Windows how to format the numbers.

Another method of interprocess communication is the Bridge command line, a useful option when you want to send a message back to Bridge from another Windows application that doesn't support DDE but can launch a program. Bridge can communicate with the application through a PUT command that types text into it, such as:

```
SELECT Write; PUT "Here's some text for Write"
```

However, the application normally can't get a message back to Bridge. The command-line method lets it launch

a second copy of Bridge, with the message for Bridge included on its command line (so that the line to launch the program would read something like BRIDGE.EXE ;EXEC EXCEL). The second copy of Bridge passes the command to the first copy and terminates while the first copy executes the command. This is pretty inefficient but may be the only way to get necessary messages back from a non-DDE application.

Get a Message Through

The centerpiece of Bridge's interprocess communications, however, is its messaging facility. Enabled by running the TSR program BRMSG.EXE before loading Windows, the facility acts as a mail service that routes messages between Bridge and DOS applications, other Windows applications and those running on other workstations across a NetBIOS-compatible LAN.

In order to communicate with a DOS application via the messaging facility, Bridge must first launch the application along with BRDOS.EXE, a DOS shell that handles the actual communication with BRMSG. If Windows is running in 386 Enhanced mode, Bridge gains the ability to send keystrokes to DOS applications, to select and copy parts of its screen to the keyboard, to wait until a specified string of characters appears before executing further commands (you might, for instance, have it wait until 1-2-3's READY indicator appears before issuing a command to save a worksheet), to set up hotkeys for the application and to paste the contents of the Windows clipboard into the application.

Thus, with 1-2-3 already running in the BRDOS shell, you can pass it commands to erase its current worksheet with this line:

```
SELECT 123; PUT "/wey"
```

or to load a file whose name was stored in the variable "f" with this line:

```
SELECT 123; PUT "/fr{ESC}{ESC}%f%~"
```

Or, you can notify Bridge that 1-2-3 is ready to accept additional commands with this line:

```
SELECT 123; ON SCREEN READY 1 76 1 5 MSG SEND MYMBX 123
   "OK"
```

(The coordinates 1 76 1 5 tell Bridge where to look for the READY indicator. The rest of the line sends the message "OK" to the MYMBX mailbox set up by the messaging facility and identifies 1-2-3 as the sender.)

If you run Windows in Standard or Real mode, Bridge's ability to communicate with DOS applications is crippled—it can't interactively pass commands to the DOS application. It can pass commands to it upon launching it, even if the application doesn't support command-line parameters. Thus, the following command can launch 1-2-3 and load the BUDGET.WK1 file:

```
EXEC BRDOS 123; PUT "/frbudget~"
```

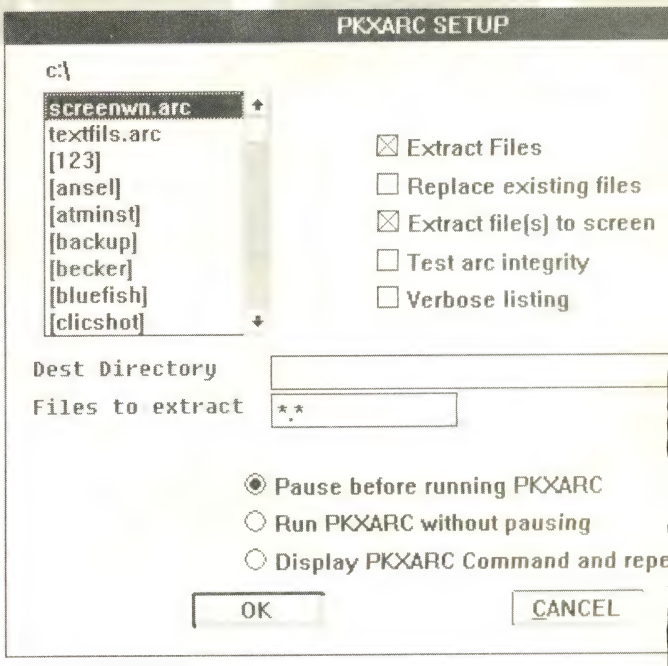
Once the file is loaded, you can interact manually with 1-2-3 until you quit, after which your Bridge application will continue to execute.

Bridge's messaging facility can also exchange messages with other Windows applications that have been compiled with the BRDYN.LIB file included with Bridge Tool Kit. BRDYN.LIB gives the applications functions to access the Bridge Message Controller. Thus, if you're writing Windows programs in C, you can include messaging capabilities quite easily.

Finally, Bridge's messaging facility can send messages over a NetBIOS-compatible LAN to another Bridge application running on another PC. Each PC must have BRMSG.EXE loaded into memory and must have used it to create a unique network mailbox name. Then the two applications can exchange data and messages interactively as long as the network link exists.

Bridge Tool Kit's unique interprocess communications capabilities, combined with its strong user-interface design tools and its straightforward command sequence, make it a powerful and surprisingly simple systems integration tool. Its $695 price makes it less suitable for casual programmers than BatchWorks, but for those who are seriously interested in linking off-the-shelf applications into integrated systems, neither that price nor the $125 cost of the Bridge runtime module ought to stand as a serious deterrent.

Bridge Tool Kit *List Price:* $695; runtime module, $125. Softbridge Inc., 125 CambridgePark Drive, Cambridge, Mass. 02140; (800) 955-9190, (617) 576-2257.



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HOLIDAY SECRET WEAPON

By Don Steinberg & Jimmy Guterman

'TIS THE SEASON. The season to stand, bored, in the overheated living rooms of vague acquaintances, enduring small talk with strange dentists and washing down forkfuls of cheesecake with strange eggnog. Holiday time means mingling time. And mingling means getting hit with the usual barrage of unwelcome questions: *So, you know a lot about computers, huh? Well what kind of computer do you think I should buy [for my wife/daughter/son/mother]?*

Unfortunately, this is a holiday season during the information age, and our passion for PCs leaves us vulnerable. Vulnerable to those who were pursuing frivolous, non-computer-related activities, like getting dates, while people like us were hunched over terminals punching out FORTRAN subroutines. Now, like fairy-tale grasshoppers who cavorted all summer instead of doing their homework, they're back—begging for advice from those of us who prepared adequately.

Wait a minute! you feel like saying. *This is a party! I am here to forget about work, not dredge it up. So what if I use a PC at work? You're a teacher. Teach me something! You're a doctor. Could you examine my throat? You're an auto mechanic, so let me ask you this: What kind of snow tires should I buy?*

That's what you feel like saying. The sad truth is, the only gracious way to dispatch this technoblivious party guest is to cough up an answer—*any* answer. But where do you begin to give an utter stranger advice on what kind of computer to buy?

Right here.

Attached is a simplified way to give a suitable response to any computer-deprived wretch who begs you for advice. It won't let you pass for a $120-an-hour consultant (most of us would need much nicer suits for that, anyway), but it'll do the job. And then you can get back to the party. We call it the *PC/Computing* Holiday Secret Weapon.

Here's how it works: First, make sure the PC inquirer is earnestly seeking an answer to his or her cloying computer question (rather than just trying to distract you as a ploy to cut into the pecan-pie line). Once that's confirmed, whip out the device. Say you've got the solution in hand. All your subject has to do is to answer four simple questions:

1) What application will drive the use of the PC?
2) Where will the PC be used most often?
3) What is the most coveted item within 50 feet of the PC's planned site?
4) What's a reasonable price for a desktop PC?

These are multiple-choice questions. Each has six possible answers, which are printed along the edges of each wheel. Upon receiving each answer, rotate the wheel so that the given answer appears in the indicated window (such operation will be implicit after the device has been assembled).

SIMULATED APPLICATION

Jim, an independent insurance agent, asks you-know-what. Slyly produce from its hidden place the *PC/Computing* Holiday Secret Weapon.

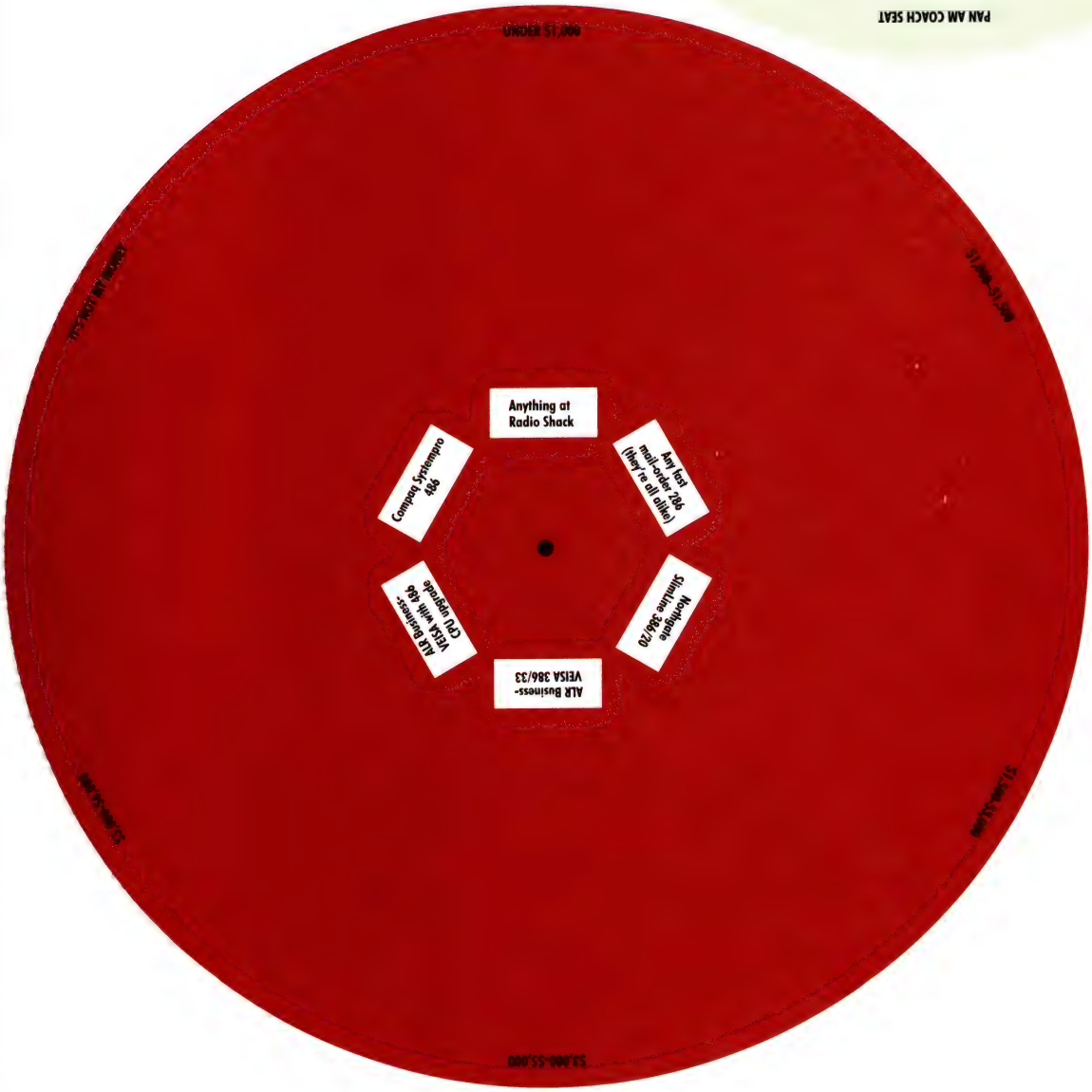
Jim, you say, *what application will drive the use of the computer?* From the available choices he selects "Savings and loan administration." Assure him it's close enough, and rotate the wheels accordingly. *Jim,* you continue, *where will the PC be used most often?* "On a desktop," he chooses from the given alternatives. *What's the most coveted item within 50 feet of its planned site?* you ask. He selects "Boss's antique oak desk." Finally you ask, *What's a reasonable price for a desktop PC?* "Between $1,500 and $3,000," answers Jim. The gears glide into place to reveal a PC system chosen especially for him: a Northgate SlimLine 386/20.

PHOTOGRAPH BY ED BRAVERMAN

PC Computing

HOLIDAY SECRET WEAPON

Are yahoos pestering you for PC-buying advice? Fight back! Our Holiday Secret Weapon puts snappy answers at your fingertips.



your official

INSTRUCTIONS FOR

assembly

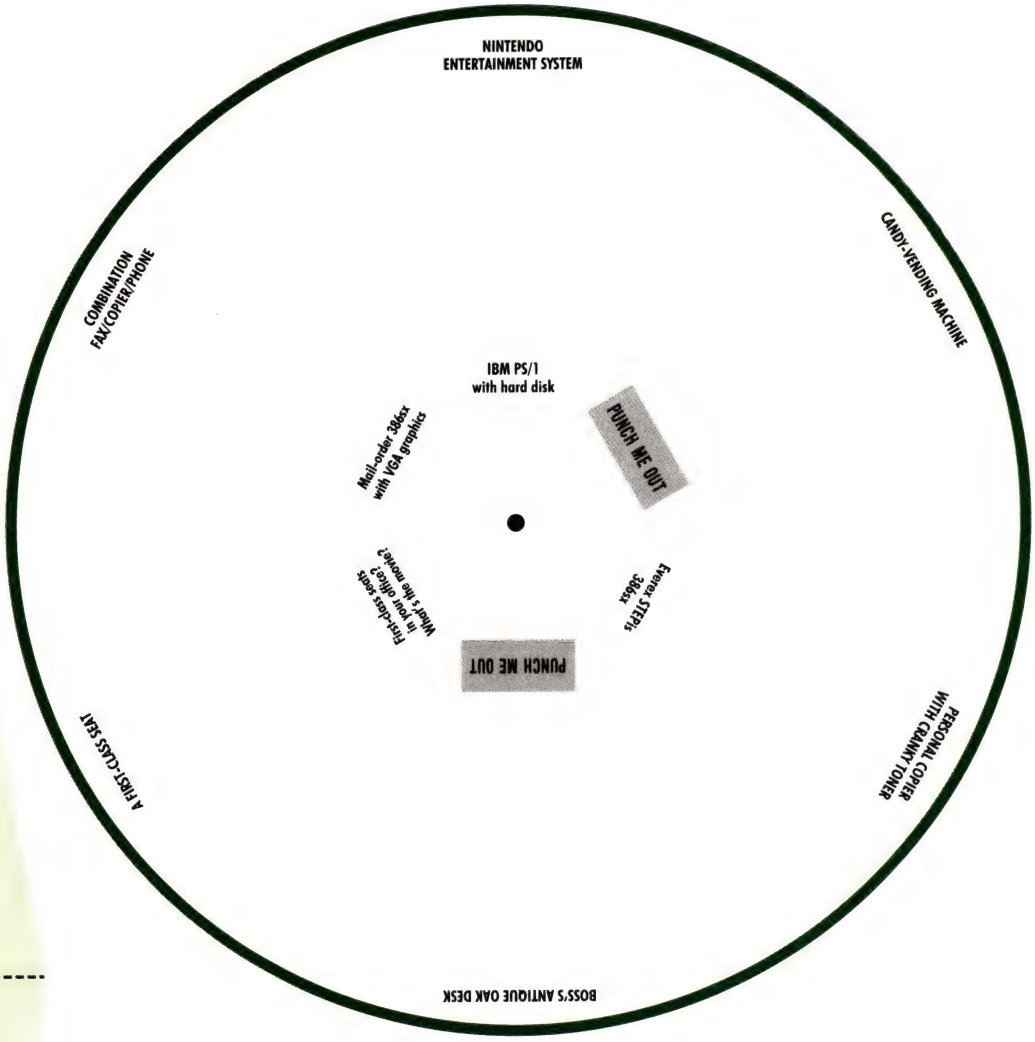
1. Punch out each of the *PC/Computing* Holiday Secret Weapon's five pieces along the perforated lines. Four of them are simple wheels. The fifth and smallest wheel contains a diamond-shaped extension called the ANSWER FLAP. Do not separate the ANSWER FLAP from the wheel.

2. Punch out the indicated rectangles in the center ring of each circle and the ANSWER FLAP. Warning: Punch out only the darkened areas labeled "Punch Me Out."

3. Using a pin, prick a small hole in the center of each wheel and in the small circle at the tip of the ANSWER FLAP.

4. Align the wheels concentrically (like Dante's vision of hell), with the smallest wheel on top. Firmly fold the ANSWER FLAP along the dotted line that crosses the middle of the diamond, so the hole at the tip of the ANSWER FLAP folds behind the wheels and the hole at its tip aligns with the other holes.

5. Insert a round-head fastener through the center holes and out the back of the ANSWER FLAP. In the absence of a round-head fastener (in many offices they are extinct), a small screw from the back of your desktop PC will suffice. (Nobody will notice. There are too many screws back there anyway.)



PUNCH ME OUT

What's a reasonable price for a desktop PC?

PUNCH ME OUT

What is the most coveted item within 50 feet of the PC's planned site?

PUNCH ME OUT

Where will the PC be used most often?

PUNCH ME OUT

What application will drive the use of the PC?

PUNCH ME OUT

Put this under your tree, dude.

PC Computing

Holiday Secret Weapon

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Storage: 1.2MB, 5.25 inch, high density, double sided diskette drive, OR 1.44MB, 3.5 inch, high density, double sided diskette drive. 40MB IDE hard drive.
Keyboard: 101-key enhanced layout.
Video: 16-bit VGA adapter with 256KB RAM, expandable to 512KB. 14 inch VGA monochrome display.
Options: Additional options available. Please call for details.

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Memory: 2MB memory standard; expandable onboard to 5MB. 16MB system maximum.
Storage: 1.2MB, 5.25 inch, high density, double sided diskette drive, OR 1.44MB, 3.5 inch, high density, double sided diskette drive. 110MB IDE hard drive.
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Video: 16-bit VGA adapter with 256KB RAM, expandable to 512KB. 14 inch VGA monochrome display.
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Video: 16-bit VGA adaptor with 256KB RAM, expandable to 512KB. 14 inch VGA monochrome display.
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Memory: 4MB memory expandable to 64MB of 64-bit memory.
Storage: 1.2MB, 5.25 inch, high density, double sided diskette drive, OR 1.44MB, 3.5 inch, high density, double sided diskette drive. 200MB IDE hard drive.
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Video: 16-bit VGA adapter with 256KB RAM, expandable to 512KB. 14 inch VGA monochrome display.
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Memory: 4MB standard memory, expandable to 16MB of 32-bit memory.
Storage: 1.2MB, 5.25 inch, high density, double sided diskette drive. AND 1.44MB, 3.5 inch, high density, double sided diskette drive. 200MB IDE hard drive.
Keyboard: 101-key enhanced layout.
Video: 16-bit VGA adapter with 256KB RAM, expandable to 512KB. 14 inch VGA monochrome display.
Options: Additional options available. Please call for details.

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Memory: 4MB memory standard; expandable to 64MB of 64-bit memory.
Storage: 1.2MB, 5.25 inch, high density, double sided diskette drive. AND 1.44MB, 3.5 inch, high density, double sided diskette drive. 200 MB IDE hard drive.
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Help

168 SOFTWARE SECRETS
Make Windows 3.0 icons readable • Change the .DOC default in Word for Windows • Map 1-2-3 spreadsheets • Create a WordPerfect index

PRO TIPS
172 Spreadsheets: Running totals
174 Databases: FoxPro help screens
180 Desktop Publishing: Create bar charts

Make Your Own Custom Cables

When off-the-shelf cables aren't right for your system, it's easy to make what you need. By William Barden, Jr.

TOO OFTEN, CABLES for modems, printers and other devices are either 10 feet too short or 10 feet too long. Perhaps one cable won't reach where you want to place your printer, or the cable connected to your modem bunches up in a tangled mess on your desk. For a really custom PC setup, use custom-made cables tailored to your workspace.

If you're short on time or you're not a do-it-yourselfer, the simplest approach is to pay a computer repair shop to make a cable to the exact length you need. Before paying for a custom cable, familiarize yourself with them, so that you ask for what you really need and get a fair price—$30 or more, depending on the length of the cable and the complexity of the wiring in the connectors.

If you don't mind using a few simple tools, however, it's often better to make a cable yourself. Materials generally cost less than $10. Just as important, some peripherals—such as plotters and printers—don't use standard *pin-outs*, connections for transmitting data to and from a PC. With eccentric devices, your only choice may be to make your own cable, experimenting until you find the correct wiring configuration.

With more standard devices such as a modem, pin-outs are usually no problem. But whether the pin-out is straightforward or obscure, making the cable requires nothing more daunting than soldering—and you can usually avoid that.

Your computer may have one of two types of serial ports. One is a 25-pin "D-sub" (D-subminiature) connector, a connector with 13 pins on a top row and 12 pins on a bottom row. Other PCs use a 9-pin serial port connector. Each *pin*—either a metal rod that plugs into a hole or the hole itself—is numbered.

We'll use the 25-pin connector as an example. If your serial port has a 9-pin connector, follow our instructions for the 25-pin, to avoid confusion between numbering for 25-pin and 9-pin connectors. Then buy a 25-pin-to-9-pin converter, available for less than $5 at Radio Shack (part number 26-265).

Serial cables have a female D-sub on one end and a male D-sub on the other end. The male/female nomenclature follows anatomical logic: Male D-subs have two rows of protruding pins, while female D-subs have two rows of holes into which the pins fit. The cable connecting the two D-subs may be a flat ribbon or a round cable in which a plastic sheath covers individual wires.

Straight Serial Cable

The simplest type of serial cable contains wires that run from each pin on one end to the matching hole on the other end. Pin 1 connects to hole 1, pin 2 to hole 2, and so on. The simplest method to make this sort of cable is to use a length of 25-conductor ribbon cable (Radio Shack part 278-772, $3.59 for a 5-foot length) and two connectors: a female IDC (insulation displacement connector) 25-pin D-sub (Radio Shack part 276-1565, $3.99) and its male counterpart (Radio Shack part 276-1559, $3.99). You can find the parts at other electronic or computer stores. You'll also need two small pieces of heavy cardboard and a pair of vise-grip pliers.

Cut the 25-conductor ribbon cable to length. Ribbon cable is usually gray with red or red-and-blue bands indicating the pin-1 side of the cable. Each IDC connector has individual pins labeled 1

Align cable so the red or red-and-blue side is over the pin-1 side of the connector.

Apply pressure evenly, using vise grips and cardboard to cushion the connector pieces.

190 HOW IT WORKS
DOS multitasking

194 Q&A by Jeff Prosise
Free hidden-file finder and printer-port switching programs • All about interleaves • Getting the most from extended memory • Three tricks for adding a 3½-inch floppy drive

196 STARTUP
Your own PATH editor

198 BATCH
Batch file timer

202 HARD DISK
Quick-and-dirty file security

207 FAST FACTS
Batch commands: CALL, COMMAND /C

210 TOOLKIT
ASCII text converter

212 DOS by Chris DeVoney
DOS's most dangerous commands

216 WINDOWS by Craig Stinson
Start Windows 3.0 your way

218 TECHNOGUIDE
CPU terms

through 25. The labels, next to the pins on the connector, are often difficult to see without a magnifying glass.

Locate the pin-1 side of one connector and insert the cable through the hole in the connector, so that the pin-1 side of the ribbon cable and the connector are aligned. The ribbon cable should project about 1/16 inch beyond the connector edge. Make sure the ribbon cable is aligned in the connector at a right angle and midway between the connector sides. This is usually no problem, as the connector path is just wide enough to admit a 25-conductor ribbon cable.

Once the ribbon cable is loosely inserted, move the top portion of the connector down onto the cable and press the two portions of the connector lightly together. This pushes sharp, pointed contacts into the insulation surrounding each wire in the cable.

The final step is the most important. The top portion of the connector must be driven firmly into the ribbon cable so that all 25 pins pierce the cable and contact the wires inside. Place a small piece of cardboard on each end of the connector. Working slowly across the connector, squeeze the two portions of the connector together using the vise-grip pliers. Make several passes instead of putting too much pressure on one end, to avoid bunching the cable. Increase the pressure with the vise-grips for each pass. When the top portion of the connector has been pressed together properly, it will snap into place, locking the halves of the connector together.

Some connectors, such as Radio Shack's, come with a cover that fits over the connector top. This provides added support to ensure that the cable does not pull out of the connector. Fold the ribbon cable over the top of the connector and snap the cover onto the connector. Ignore the cover if the cable assembly will not be subjected to repeated tugging or other physical strain.

Repeat the entire process with the second connector on the other end of the cable, making certain that the pin-1 side of the cable is over that of the connector.

Once the two connectors are assembled, verify again that the red band is on the pin-1 side of each connector and the ribbon cable is squarely aligned and centered in both connectors. You should now have a working cable. If you have problems, verify the connections on the pins by using a continuity tester (Radio Shack part 22-110, $16.95).

Making a Crossover Cable

Not all cables connect matching pins. For example, a null-modem cable—used to connect two computers in serial without using a modem—requires a *crossover,* which connects pin 2 on one end to to pin 3 on the other end, and vice versa. Printer cables also often require crossovers because they convert the 36 signals found on a male Centronics connector, located on the printer, to the 25-pin connector on the cable end that plugs into the PC. (The PC's parallel port looks like a serial port except that it is always a 25-pin connector and usually female.) Eighteen wires from the printer side are unused; 14 of the 18 wires that are used involve some crossovers.

When making a serial or parallel cable that involves crossovers, consult your hardware's manual to find out which pins on one end match which pins on the other end. Be prepared to experiment if, as sometimes happens, the manual's information is not complete or correct.

The snap-on connectors used with a straight cable won't work with a crossover serial cable. Instead, use round cable that contains individual, color-coded wires. Radio Shack carries a 36-wire, 6-foot cable (part 278-774, $4.69); if you need a longer cable, an electronics parts store can sell you one cut to any length. You can strip the ends of the wires and insert the bare ends into individual metal pin connectors in either a female or a male connector housing. Solder the connections or crimp the pins with either needle-nose pliers or a crimping tool to hold the wires in place.

On the female end, the pins generally are attached permanently to the housing. But you can buy male connectors that don't have the pins built in, so that you can connect the wires to the individual pins and then snap the pins into holes in the male connector. This snap-in arrangement lets you change the pin-outs easily if you need to experiment.

For a printer cable, use the same type of pins and male connector, but on the other end use a Centronics-type connector (Radio Shack part 276-155, $3.99).

If you solder the connections, use any soldering iron or gun and small-diameter, rosin-core electrical solder. If you crimp the connections, use either needle-nose pliers or a wire crimper (often found on a wire stripper). ◩

William Barden, Jr., is a PC consultant and the author of more than 30 computer-related books.

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Windows 3.0

Space Your Icons

In its default mode, Windows 3.0 places icons so close together that the text descriptions accompanying these icons often overlap. Using the Desktop option of the Windows Control Panel, eliminate this problem by following these steps:

Double-click on the Control Panel icon located in the Main group and then on the Desktop icon. When the Desktop dialog box appears, click on the up arrow next to the "Icon spacing" prompt to increase the default spacing Windows uses to separate icons. A value of 100 is enough to separate all but exceptionally long icon titles. Once you've set a spacing value, click on the OK button.

When you exit the Control Panel, Windows positions icons using the new default setting. Full text descriptions should now fit easily below each icon. Windows won't apply the new settings to current screens, however, until you either select an icon or end the current session and restart Windows.

Cheat at Solitaire

There's no way to guarantee you'll win at the solitaire game included with Windows, but you increase your chances by using the Drag features listed under the game's options menu. When you turn on Drag, moving a card over a stack that the card can be placed on legally causes that stack to change to an outline image.

To make sure you don't miss any moves that might help you, keep Drag turned on, and every time you flip over a new card, pick it up and sweep across all the stacks. You'll easily spot any opportunities you might have missed. It's a good idea too, from time to time, to pick up the cards already placed on stacks and sweep them across the other stacks to make sure some opportunities haven't appeared during the game.

Word for Windows

Change .DOC Default

When you click on File Open in Word for Windows, the dialog box comes up with the wildcard filename *.DOC already in place. Word for Windows assumes that you give all documents a .DOC extension—not a good assumption considering all the more informative three-character extensions possible. If you aren't always looking for .DOC files, you have to change the default manually each time.

Change the default so that the dialog box, for example, appears with *.* each time, or displays any other extension that works better for you. First open any file, then click on Macros and Edit. Look for a macro called FileOpen; this is the code that controls the action of the File Open dialog box. If FileOpen doesn't appear in the list of available macros, click on the box next to "Show All" or just type in the name FileOpen. The code that makes up that macro will appear in the macro editor. It should look like this:

```
Sub MAIN
Dim dlg As FileOpen
GetCurValues dlg
Dialog dlg
Super FileOpen dlg
End Sub
```

If you want to change WinWord so that you're presented with a *.* option in the dialog box, insert three lines so that the macro listing reads as follows:

```
Sub MAIN
On Error Goto ENDER
Dim dlg As FileOpen
GetCurValues dlg
  dlg.NAME = "*.*"
Dialog dlg
Super FileOpen dlg
ENDER:
End Sub
```

If you want to use a wildcard filename other than *.*, include the pattern you want within the quotes in the line beginning with dlg. The lines beginning with On Error and ENDER eliminate an error box that appears if you cancel the dialog box without choosing a file. Note the colon at the end of ENDER on the next-to-last line.

Now close the file. You'll be asked if you want to save it; click on Yes. Then exit Word for Windows. You'll be asked if you want to save global changes to the glossary and commands; click Yes again. When you re-enter Word for Windows and open a file, the dialog box gives you the filename pattern you want.

Lotus 1-2-3

Back Out of Menus

You can always back out of a 1-2-3 menu by pressing the Esc key several times. But if you're several levels deep into the menu structure and want to return to Ready mode quickly, just press Ctrl-Break once.

Map Worksheets

With 1-2-3 Release 3, you can get a map of which cells are empty, which contain labels, which contain numbers and which contain formulas. The map is helpful when formulas or macros don't work as they should, and you need to trace the source of the problem.

Bring up the menu and choose Worksheet Window Map Enable, and a grid of cells appears with each column one character wide. Blank cells appear blank, cells with labels contain ", cells with numbers contain # and cells with formulas contain +. To return to your spreadsheet from the map, just press Esc. Use the Worksheet Map to detect cells that look as if they're blank but contain a single quote—a problem difficult to detect and remedy in previous releases.

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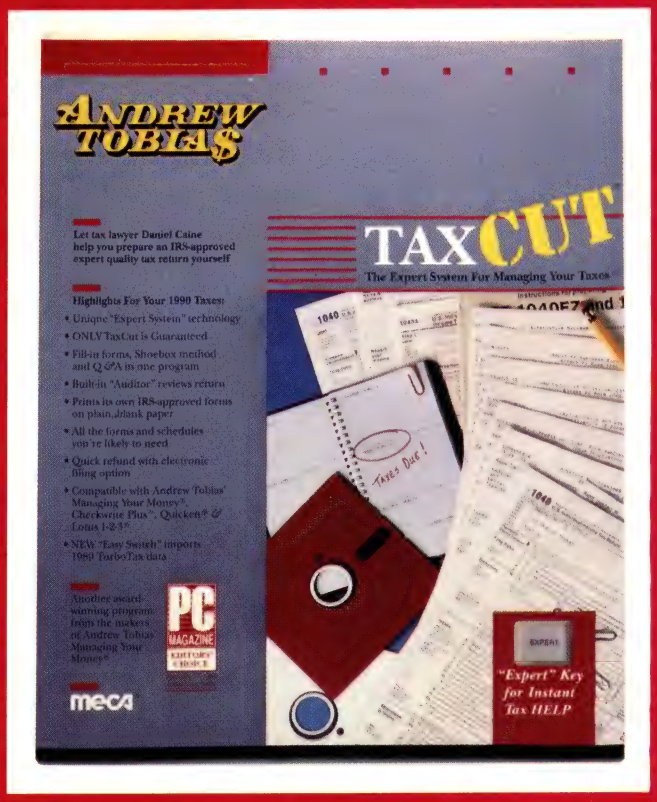

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Get Category Totals

If you use dBASE to keep track of your tax-deductible purchases, you will need to produce a separate total for all the purchases in each tax-deductible category. Do this easily by creating a database in which each record contains the total amount of all the purchases in a category.

Say your database contains fields called Category and Amount. First, index your records on Category with the command:

```
INDEX ON Category TO Categ
```

Then, enter the command (on one line):

```
TOTAL ON Category TO Newfile
```

Then, use Newfile, which has the same structure as your original database but contains only one record for each category. The Amount field of a record whose category field contains the word *medical* contains the total of all the amounts listed in the original database as medical expenses.

Character fields in the new database simply show the entries in the first record encountered when the category changes. Thus, the contents of character fields other than your key field Category are, by and large, inconsequential.

Your problem may require separate totals for all items in a certain month of the year or for each employee. This technique works in those situations—in fact, whenever you need a total for sets of items in different classifications. Although a report form can also create category totals, the technique here lets you perform further calculations on the category totals without re-entering data.

Microsoft Word

Easier Document Formats

Microsoft Word's stylesheets are great for formatting documents with complex formats or with lots of format changes. But if you're creating a new document that won't have complex formatting, save time by formatting it before you start entering text.

Start by pressing Enter three or four times to create blank lines. Press Shift-F10 to select the whole document, then set the page size, margins, line spacing, typeface, font size and any other formats that you'll be using through the entire document.

Once you have the format set, move the cursor back to the top of the document and start typing. Your text will automatically use the format you've set up.

To save even more time, create a macro or glossary entry to set up formats you use often.

Transposition Macros

Most of us are prone to transpose letters occasionally when we're typing. But although Word's spell checker will find and correct most errors, in some cases Spell won't find the mistake because the result is a correctly spelled wrong word. If you type *sue* instead of *use*, for example, Spell won't find the error. To speed correction of such mistakes, write a macro to transpose two letters that are switched.

To create the macro, press Shift-F3 to turn on the macro recorder. RM will appear in the status line to indicate that Word is recording a macro.

Press the following keys: Del, Left arrow, Ins. Then press Shift-F3 to stop recording. Word automatically goes to the Copy command.

"COPY to: {}" appears on the command line. Type "transpose_char" to name your macro. Assign it a control code by typing ^<Ctrl T><Ctrl C> immediately after the name of the macro. (Don't leave spaces between the

PRO TIPS

Daniel Gasteiger on Spreadsheets

Often, you need to maintain running totals of periodic spreadsheet data. For example, you may want to know not only the monthly sales and averages for your sales team, but also sales and averages for the year to date. The following worksheet demonstrates a technique for creating running totals that works with any spreadsheet program that supports relative, absolute and mixed cell references.

	A	B	C	D
1		Jan	Feb	Mar
2	Louis	$30,256	$32,666	$32,272
3	Strom	$24,879	$26,784	$27,669
4	Kris	$33,569	$33,910	$36,677
5		==========	==========	==========
6	Monthly			
7	total	$88,704	$93,360	$96,618
8	avg	$29,568	$31,120	$32,206
9	Running			
10	total	$88,704	$182,064	$278,682
11	avg	$29,568	$30,344	$30,964

Using relative range references, you'd need six different formulas to create the running totals and averages in rows 10 and 11. Instead, combine relative and absolute cell references to create a summary formula and an averaging formula that each calculate running totals.

The formulas in cells B7 and B8 of this worksheet are @SUM(B2..B4) and @AVG(B2..B4), respectively. When copied across rows 7 and 8, the range references in the formulas adjust relative to the columns in which the copies end up. In column C the formulas read @SUM(C2..C4) and @AVG(C2..C4), and in column D they read @SUM(D2..D4) and @AVG(D2..D4).

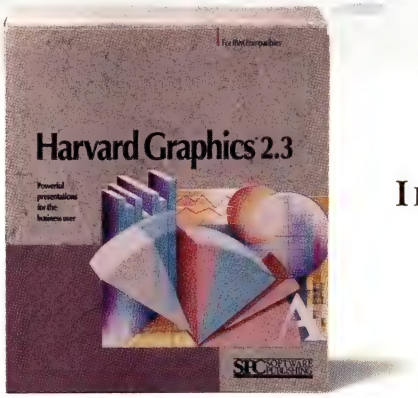
The running total formulas in cells B10 and B11 are @SUM(B2..B4) and @AVG(B2..B4). However, when copied across rows 10 and 11, only the second halves of the range references in these formulas—the references to cell B4—adjust relative to the new columns. The first halves—B2—are absolute. They refer to cell B2 no matter where you copy them in the worksheet.

In cell C10, the @SUM formula reads @SUM(B2..C4), and in cell D10 it reads @SUM(B2..D4). Copy this formula as needed across the sheet, and each copy will calculate a running total through the column in which it falls.

To calculate running totals adjacent to a series of values in column A, enter the formula @SUM(A1..A1) into cell B1 and copy it down the worksheet as needed.

Daniel Gasteiger, a contributing editor to PC/Computing, heads a PC consulting and training firm in Boston.

PHOTOGRAPH BY MARK ALCAREZ



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Software Secrets

macro name and the control code.) Then press Enter to store the macro in the glossary.

To use the macro, place your cursor on the second letter and press Ctrl-TC. Use the same method to create a macro that transposes two words or even two sentences.

To create a macro for transposing words, press the following keys: F8, Del, F7, Ins. Make up your own macro name and control code. To run the macro, position the cursor anywhere within the second word.

A macro for transposing sentences requires the following keys: Shift-F8, Del, Shift-F7, Ins. To run this macro, place the cursor on any character in the second sentence.

Split Windows

If you frequently open more than one window when using Microsoft Word, write a couple of quick macros to open and clear windows.

To create a macro, press Shift-F3 to turn on the macro recorder. RM will appear in the status line to indicate that Word is recording a macro. Press the following keys: Ctrl-Esc, W, O, H, Enter. Then press Shift-F3 to stop recording. Word goes to the Copy command.

PRO TIPS

Mike Falkner on Databases

Terse error messages are annoying and confusing. Use FoxPro's windows and memo fields to create descriptive, useful messages for novice database users. The following program assists users who are updating a sample database we'll call VENDOR. It consists of two fields, Vendor (C10) and Address (C25). (The characters in parentheses are FoxPro's notation for the type and length of the field; C10, for example, signifies a 10-space field that accepts any type of character.)

First create a FoxPro database, called HELPERR, with four fields: Field (C10), Ecode (N1), Bell (N1) and Text (memo). Now fill in the fields and create a new record for each error message. In Field, store the field name associated with your message. In Ecode, use Ø for help messages, 1 for errors. In Bell, store 1 for messages that need a beep. Put a message in the memo field Text.

Now create the program ENTER.PRG. Begin indented lines with two spaces.

```
USE Helperr IN 2
USE Vendor IN 1
SET TALK OFF
SET MEMOWIDTH TO 70
ON KEY LABEL F1 ;
  DO Help WITH SYS(18),0
ON READERROR ;
  DO Help WITH SYS(18),1
CLEAR
APPEND BLANK
@ 2,5 SAY "Vendor : " ;
  GET Vendor RANGE;
  "A","zzzz"
@ 3,5 SAY "Address: " ;
  GET Address
READ
PROCEDURE Help
PARAMETERS RFIELD,ERR
SELECT Helperr
GO TOP
LOCATE FOR
RFIELD=TRIM(UPPER(Field));
  .AND.ERR=Ecode
DEFINE WINDOW Help FROM ;
  22-MEMLINES(Text),4;
  TO 23,75
ACTIVATE WINDOW Help
? Text
?? IIF(Bell<>0,CHR(7),"")
WAIT ""
RELEASE WINDOW Help
SELECT Vendor
RETURN
```

To execute the program, type DO ENTER. A data entry screen for VENDOR appears and users can enter information. If they press F1 or cause an error, the program searches HELPERR for the name of the affected field and displays the appropriate message in a help window. ◪

Mike Falkner is a PC consultant and manager of user support for a California-based manufacturer.

PHOTOGRAPH BY RICH PEDRONCELLI

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March 14, 1989
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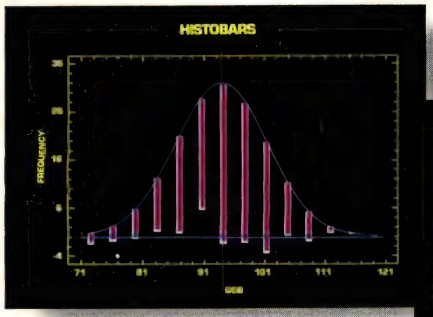

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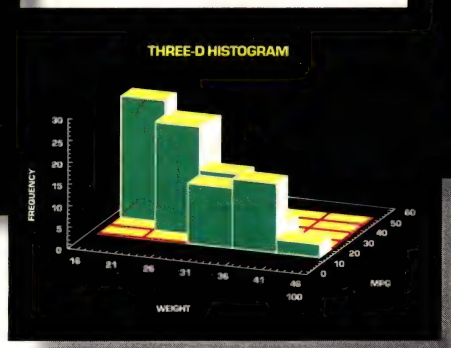

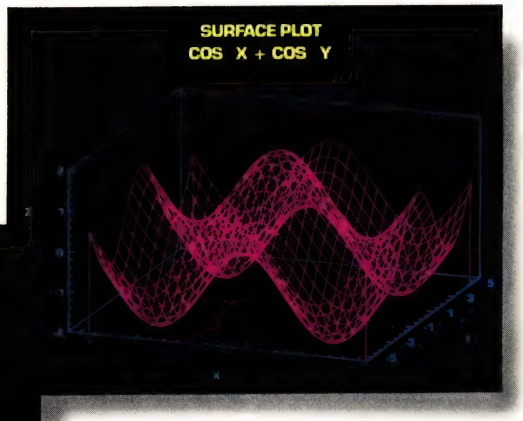

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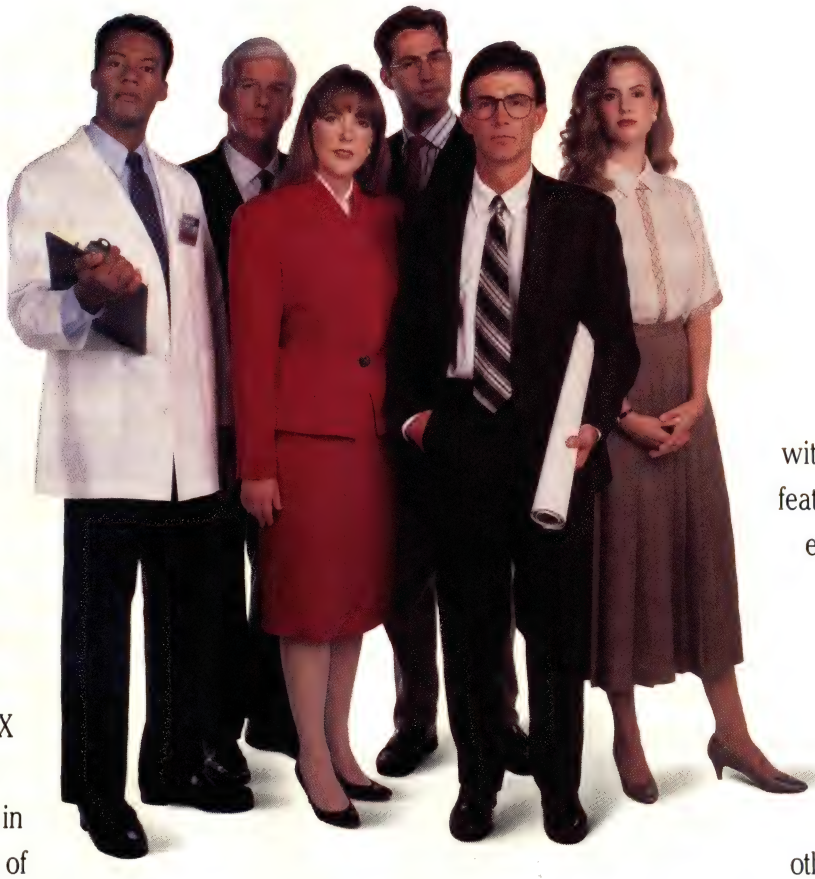

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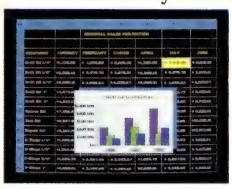

The COMPAQ DESKPRO 386S Personal Computer is also designed to handle general business applications. Its 16-MHz 386SX microprocessor gives you exceptional 386 performance. And its 32-bit architecture lets you run today's popular business software. It also offers the flexibility to run tomorrow's advanced business software.

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The stars.

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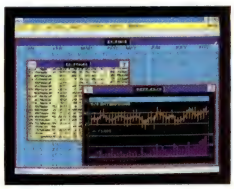
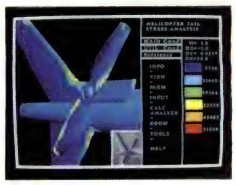


At the most demanding level of 386 computing are the power users who do graphic-intensive applications like 3-D CAD drawings and other performance-intensive applications. These people need the kind of high performance that the COMPAQ DESKPRO 386/33L Personal Computer delivers. It combines the fastest 386 chip with high-performance innovations. And it lets you easily upgrade to the power and performance of a 486 chip.



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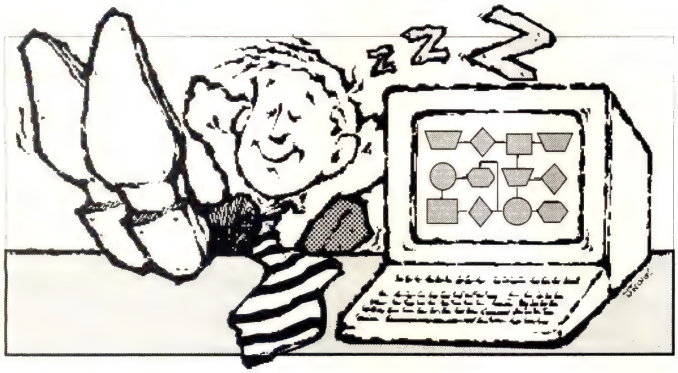

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CIRCLE NO. 214 ON READER SERVICE CARD.

"COPY to: {}" appears on the command line. Type "window_open" to name your macro. Assign a control code by typing ^ <Ctrl W><Ctrl O> immediately after the name of the macro. (Don't leave spaces between the macro name and the control code.)

Then press Enter to store the macro in the glossary. This macro will open a window containing the same document you had in the original window. To open a window and clear it, create another macro: Ctrl-Esc, W, O, H, Right arrow, Y, Enter. Give this macro the name "window_open_clear" with the control code WOC.

In both cases, position your cursor wherever you want the new window to appear upon the screen before you run the macro.

WordPerfect

Create a Concordance

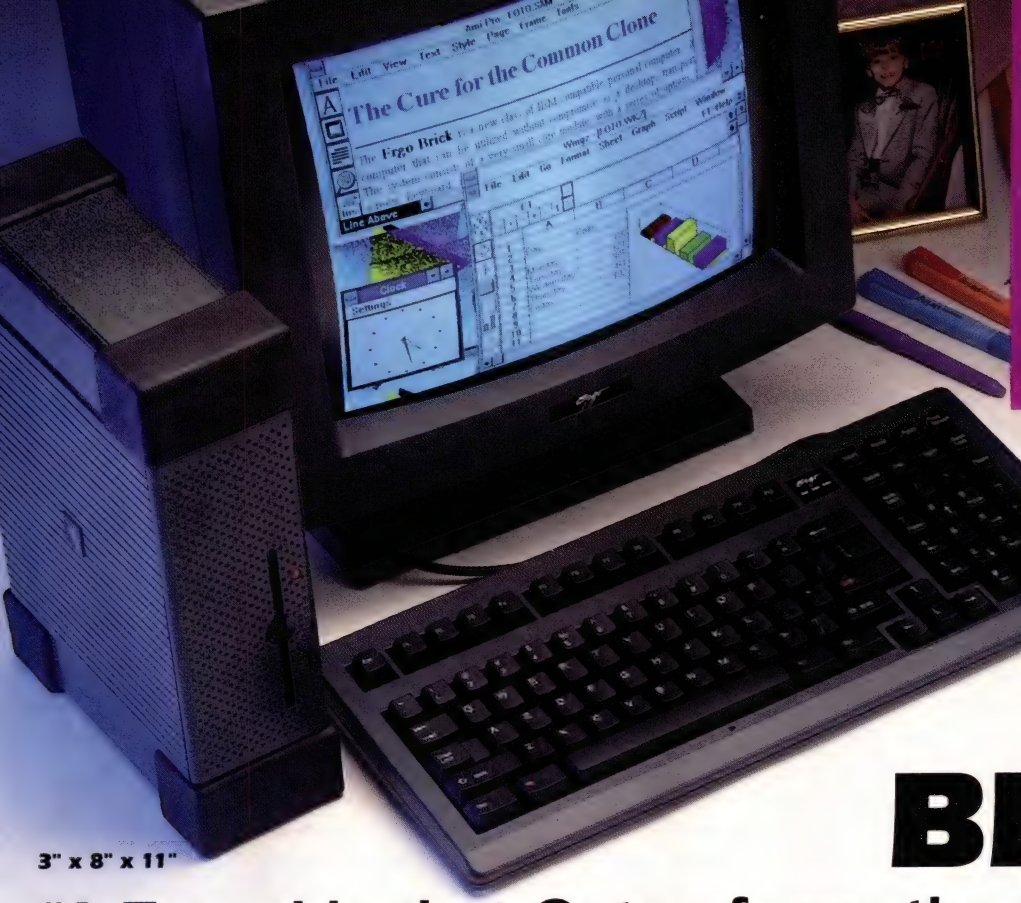
The easiest way to create an index in WordPerfect 5.1 is to use a concordance file. Instead of typing entries into the concordance, use the following macro to create the file.

To begin, the file to be indexed should be loaded into one of the WordPerfect document screens. The document on the other screen will be the concordance and should be empty—or contain only concordance entries.

This macro copies a block of text that has been marked, so before you begin creating the macro, use Block (Alt-F4) and the cursor keys to mark a sample word or phrase.

Words enclosed in angle brackets are WordPerfect's conventions for keynames. You'll see them in brackets if you later edit the macro. Press the keys that correspond to the names, but type the characters not in brackets as they are shown here. The text in parentheses explains what each step of the macro does—don't type it.

```
<Macro Def.> (Begin macro definition.)
<Alt-C> (Call the macro Alt-C.)
Copy text to concordance<Enter> (Type
   macro description.)
<Move>bc (Copy marked block.)
<Switch> (Switch to other document.)
<Home><Home><Down> (Go to end of docu-
   ment.)
<Enter> (Paste copied text into document.)
<End><Enter> (Go to next line.)
```



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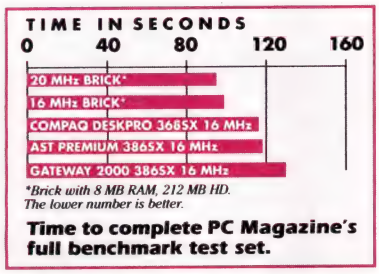

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PRO TIPS

Sharyn Venit on Desktop Publishing

PHOTOGRAPH BY ED KASHI

Here's how to produce a perfectly scaled bar chart and add some touches that spreadsheets and even specialized graphing can't create.

Many drawing programs, such as Adobe Illustrator and Corel Draw, let you scale rectangles numerically, which is easier than using your eyes and a mouse.

To start, determine the width of each bar. If the text width on the page is 7 inches and your chart has six bars, you might make each bar 1 inch wide and reserve an inch for axis labels and space between bars.

Using the Rectangle tool, draw a rectangle the width of one bar and the height of 1 inch, 10 picas, or 100 points, depending on the unit of measure you're working in. This height will represent 1, 10, 100 or 1,000 units in the chart, or whatever power of 10 is closest to the median value of your bars. If the values of your bars range from 550 to 1,500, the median would be about 1,000.

Make as many copies of this median unit as you need for bars and arrange them along a horizontal line. Scale each bar vertically by entering numeric values in a dialog box. In Corel Draw, select a bar and, from the Transform menu, choose the Stretch and Mirror dialog box, which lets you stretch the bars vertically by a percentage as shown in the table below. In Adobe Illustrator, press Alt and click the scale tool pointer on the base of a bar to get the Scale dialog box. Then enter non-uniform scaling in percentages.

Derive the percentage values by moving the decimal in the value you wish each bar to represent. The following table shows percentages used in creating a bar chart with values that range from 550 to 1,500.

	Vertical Scale	
Bar #	Bar Value	Percentage
(median)	$1,000	
Bar 1	$ 550	.55 or 55%
Bar 2	$ 800	.80 or 80%
Bar 3	$1,000	1.00 or 100%
Bar 4	$1,200	1.20 or 120%

After scaling each bar, select all bars and use the same tool or command to stretch the chart to fit the space while maintaining proportions. Add finishing touches such as axes, titles and artwork. ◪

Sharyn Venit, a co-owner of TechArt in San Francisco, has co-written nine books on electronic publishing.

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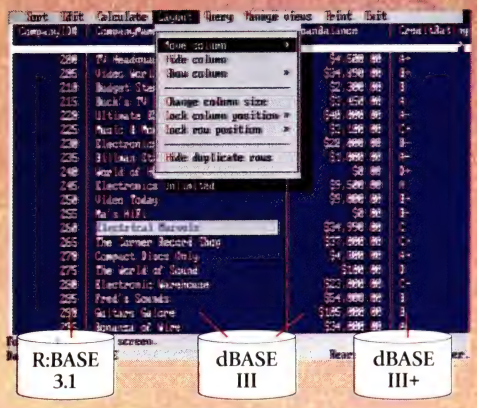
Open a better door to your dBASE data. With R:BASE 3.1's Dynamic Data Integration, you can directly read and write dBASE III and III+ files (no import/export required). Keep your existing dBASE files and applications. Use R:BASE 3.1 for ad hoc data management and new applications.

Risk free competitive upgrade and money back guarantee! This offer is good for dBASE or any commercial PC database product. Buy R:BASE 3.1 for only $195. If you aren't completely satisfied return it within 90 days for a full refund. But hurry, this offer ends December 31, 1990. Act now. See your local dealer or call **1-800-248-2001 ext.G22.**



Access multiple R:BASE and dBASE files simultaneously to retrieve data simply, get answers quickly and create reports easily in a network or on a standalone PC.

NEW R:BASE 3.1 FROM MICRORIM

IS SOMETHING STANDING BETWEEN YOU AND YOUR DATA?

INFO WORLD BEST IN ITS CLASS Jun. 25, 1990

BENCHMARKS BUYER'S CHOICE COMPUTER RESELLER NEWS

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Microrim (UK) Ltd., Doncastle House, Doncastle Road, Bracknell, Berkshire R612 4PQ England. dBASE is a registered trademark of Ashton-Tate Corporation.

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A Mouse for All Reasons...

The MousePen by APPOINT™ gives you superior control and comfort in all applications. No other mouse handles free hand drawing, desktop publishing, CAD and presentation graphics like The MousePen! The familiar shape of the pen rests naturally in either hand and with automatic gain of 50 to 1000 CPI, The MousePen responds instantly to your movements. Providing both point by point precision and the speed to zip across the screen, The MousePen is the perfect tool for any environment. The MousePen is available in three models, *PC, Mac,* and *Portable.*

PC* • *The Intelligent Way with Pen Point Precision

Beat deadlines with a flick of the wrist, fly through Windows® into one application after another. The MousePen's familiar feel and superior control makes it the perfect instrument for any environment. From quicker selection of pull down menus to more precise operation of CAD or desktop publishing programs, The MousePen outperforms the competition.

Mac* • *The Natural Way to Draw and Point

Finally there's a mouse that provides the natural human interface necessary to truly link free hand creativity with your Macintosh® environment. From FX®s to the Mac Portable or any system with an ADB® port, The MousePen*Mac* speeds you through your most sophisticated applications with a freedom and flexibility that will make your Mac feel brand new all over again.

Portable* • *The Perfect Travelling Companion

Now you can jump through Windows® at 30,000 feet. Small and lightweight, it slips easily into your laptop's case while you leap from cab to cab and plane to plane. Able to move your cursor full screen in an area smaller than an empty bag of airline peanuts, the MousePen*Portable* was designed to be your all terrain friend.

Pick one up...You won't put it down!

See Us at Comdex Las Vegas Bally's B523

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CIRCLE NO. 203 ON READER SERVICE CARD.


```
<Switch> (Go back to original document.)
<Macro Def.> (End macro definition.)
```

Once the macro is created, you can use it with any number of documents and concordance files. Define the words or phrases you want in the concordance and press Alt-C.

Q & A

Retrieve Records by Date

Q&A can't retrieve a range of records dated with the @DATE function. To work around this limitation, use Redesign to add a temporary field called Temp to your database. Then choose Mass Update from the File menu. At the Update Spec, enter the following programming statement for the Temp field. The indented line continues the previous line.

```
Date: #1
Temp: #2: if #1>08.11.89..<10.11.89 then
   #2="Y"
```

Now use Report to select all records for which Temp=Y.

Amí Professional

Careful Find-Replace

When you're using the Find-Replace function in Amí Professional 1.2 and you unexpectedly find nothing, be sure to check the Options box and look at the settings. "Whole Word Only" is on by default and causes unexpected results when searching for anything besides single, discrete words.

Magellan

Control Environment

The environment variable is not documented in Magellan 1.0, but it allows Magellan to show as many lines as your screen has.

For instance, try including the line

```
MAGSCRLEN=43
```

in your AUTOEXEC.BAT file or in a batch file that launches Magellan. The program MAGSCRLEN will switch your EGA or VGA screen into 43-line mode when you run Magellan.

A second way to use this variable is to remove the function key menu from the display. If you set MAGSCRLEN=27 on a

HIGHLY RECOMMENDED

When Accounting Today (May 1990) asked accountants which accounting software package they recommended to their small business clients, an overwhelming 29% said they recommend Peachtree's General Ledger–that's almost double the next largest competitor.

Reseller Management (March 14, 1990) asked resellers which accounting package they recommend and Peachtree came out on top again with 25% of resellers recommending it.

But accountants and resellers aren't the only ones giving Peachtree rave reviews:

"If you could find a definition for Peachtree in the dictionary, it might be 'value for your money.'"–PC Magazine 4/10/90

"It is, I believe, the best accounting package available for the price."–E.J. Bosmeny, CPA, Naperville, IL

"Complete III rivals packages costing 10 times as much."–PC Resource, July 1990

If there's one thing people agree on, it's what a great value Peachtree's Double Bonus Bundle is. That's because it includes two first-rate software packages for one low price–Peachtree Complete III, a full-featured accounting system, and Peachtree Data Query III, a reporting and analysis tool.

Peachtree Complete III includes nine high-powered modules to meet all your business accounting needs.

- General Ledger
- Accounts Payable
- Accounts Receivable
- Payroll
- Inventory
- Invoicing
- Purchase Order
- Fixed Assets
- Job Cost

Peachtree Data Query III gives you custom access to the vital accounting data in your Peachtree Complete III files. Choose from PDQ's predefined reports, customize your own reports (and store the formats for future use), even export data to popular applications like Lotus 1-2-3® and dBASE®, with no risk to your files, and no re-keying of data.

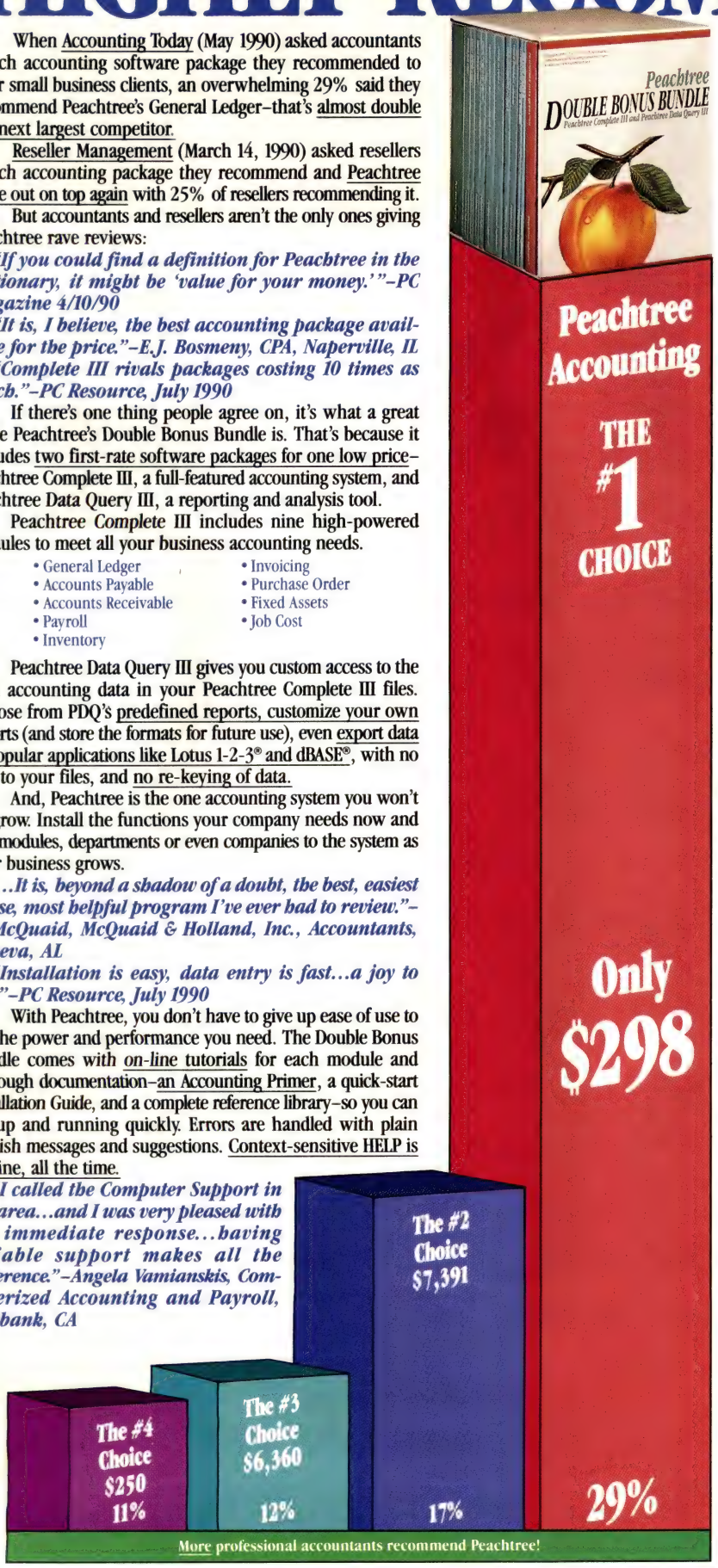
And, Peachtree is the one accounting system you won't outgrow. Install the functions your company needs now and add modules, departments or even companies to the system as your business grows.

"...It is, beyond a shadow of a doubt, the best, easiest to use, most helpful program I've ever had to review."–C. McQuaid, McQuaid & Holland, Inc., Accountants, Geneva, AL

"Installation is easy, data entry is fast...a joy to use."–PC Resource, July 1990

With Peachtree, you don't have to give up ease of use to get the power and performance you need. The Double Bonus Bundle comes with on-line tutorials for each module and thorough documentation–an Accounting Primer, a quick-start Installation Guide, and a complete reference library–so you can get up and running quickly. Errors are handled with plain English messages and suggestions. Context-sensitive HELP is on-line, all the time.

"I called the Computer Support in my area...and I was very pleased with the immediate response...having reliable support makes all the difference."–Angela Vamianskis, Computerized Accounting and Payroll, Burbank, CA



At Peachtree, we make technical support convenient for you with Authorized Support Centers in over 60 cities across the country and directly from Peachtree (support charges based on the length of the call on your credit card). And we stand behind our products with a 30-day money-back guarantee when you buy directly from Peachtree. If for any reason you're not satisfied, just return the package within 30 days for a prompt refund (less a $25 restocking fee).

"...It's the only application I recommend. The package is superb..."–Marc Barlow, Executive Vice President, AdMedia, Largo, FL

Order Peachtree's Double Bonus Bundle NOW! Find out what over 350,000 satisfied Peachtree users already know–why so many people highly recommend Peachtree.

Features

General Ledger
- Unlimited accounts
- Comparative financial statements–present or back to 2 years
- Prior period adjustments

Accounts Payable
- Partial payment of invoices
- Prints checks
- Prints miscellaneous 1099's

Accounts Receivable & Invoicing
- Maintains open item or balance forward customers
- Unlimited transactional detail
- "Ship to" address file

Purchase Orders
- Updates purchase orders and inventory
- Generate A/P invoices from purchase order

Job Cost
- Tracks profitability on a job-by-job basis

Payroll
- Unlimited number of employees
- Accrues sick and vacation time
- Prints checks, W-2's calculates Federal and State payroll taxes

Inventory
- Supports LIFO, FIFO, Specific Unit, standard and average costing methods
- Unlimited inventory items
- Serial number tracking

Fixed Assets
- Handles 13,000 assets and 13 methods of depreciation

PDQ III
- Modify pre-defined reports
- Create your own reports
- Present data in line or bar graphs
- Transfer information to dBASE III® and Lotus 1-2-3®

Hardware Specifications. Requires PC/MS-DOS version 3.0 or higher with 640K of memory and a hard disk. For use with IBM PC, PC XT, PC AT, Personal System/2 and compatibles 3½" media optionally available. Not copy protected.

Lotus 1-2-3 is a registered trademark of Lotus Development Corporation. dBASE is a registered trademark of Ashton-Tate Corporation. IBM is a registered trademark and Personal System/2 is a trademark of International Business Machines.

Peachtree Software

Call Now To Order

or for the name of the dealer near you.

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or, 1-404-564-5800

To order by fax 1-404-564-5888

add $12.50 shipping to fax and mail orders*

(In Georgia, add applicable sales tax.)

*Telephone number required on all orders

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PCC

CIRCLE NO. 256 ON READER SERVICE CARD.

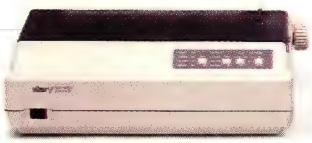
INTRODUCING

ALL THE WRITE STUFF

FOR SMALL BUSINESS TYPES

NX-2420 RAINBOW

NX-1020 RAINBOW



NX-1001 MULTI-FONT

NX-2420 MULTI-FONT

For a while there, it was beginning to look like there would never be a dot matrix printer versatile enough to be a real jack-of-all-trades. But no more. Now, for the first time ever, there's a new series of printers designed to bring you big-business performance at a small-business price.

Star's new NX Series printers have all the write stuff you need to get the job done and then some. Let's start with multiple fonts. Each of the four NX Series printers comes equipped with an incredible variety of fonts, sizes and enhancements, which, when combined, put thousands of printstyles at your fingertips. And all offer high resolution graphics for more professional-looking presentations.

Advanced paper handling features (which are optional on most printers)

DESKTOP NEWS

VOLUME 2 — *What's coming... What's going* — No. 2

Network Television

Expensive glitzy TV shows are slowly disappearing from the Big 3 networks' sweeps period programming. Month long ratings sweeps are conducted in February, May, July, and November. In the past, sweeps periods often included heavily publicized, lengthy mini-series and big-budget specials, but this year's lineup consists primarily of special episodes of regular series and a smattering of short miniseries. The reason for the change is that people meters, which measure audience viewership in 25 markets daily, have lessened advertisers' reliance on sweeps results.

Advertisers or agencies have become upset when seasonal decision-makers have two efforts. Publishers agree that the issue is one of increasing importance that must be addressed. They say agencies and advertisers are asking to be notified when any spectacular inserts - such as heavy-stock, multipage ads, scratch-and-pop-up-will-run.

Agency representatives have made the following requests:

- Inserts have the ability to change the appearance and entire feel of a magazine.

- Readers will tend to flip unexpectedly to an insert, cutting down the possibility of other ads being seen.

- Scrutinizing 10-inch ads and inserts intensively - advertising should not be brought down to a common standard where everybody just been pages.

"Pizzazz-ness" are effective as long as they are not offensive.

Where do you draw the line between what's creative and what might destroy the reader's relationship to a magazine?

MAGAZINES

Sales of niche-oriented magazines are rising. And fast. Since last year, electronics, fashion, and lifestyle periodicals have registered particularly strong growth.

Publishers have recently taken a second look at the whole concept of specialty books, and many are projecting to even larger gains for the future. "We're no longer one big market," said an expert last week. "We're many medium-sized markets. And with the inevitable overlapping, that means there's a need for many types of magazines to satisfy many types of consumers."

Ad "Pinstaculars" Under Scrutiny

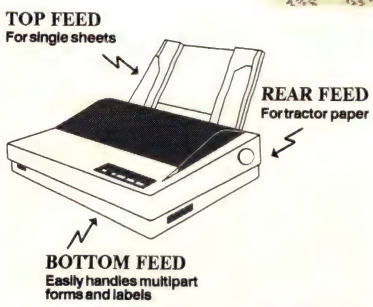
Marketers and publishers are divided over how to deal with growing criticism about cover-crept, heavy inserts and other methods used to bound through magazine or clutter.

Readers have criticized the series that rise from books, some even complaining of allergic reactions

YEAR-END CIRCULATION

	LAST YEAR	CURRENT YEAR 9 MONTHS	CURRENT YEAR PROJECTED
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Multiple fonts



Advanced paper handling

are standard with Star. The switchable push/pull tractor makes changing paper paths a snap—a feature that's especially handy when you're printing a lot of hard-to-manage forms. Plus, convenient paper parking lets you feed single sheets through at the touch of a button—without removing or wasting continuous-feed paper.

User-friendly control panel

NX printer control panels are designed for the ultimate in user-friendliness. You can easily select up to 14 of the most commonly used functions. And an Electronic Dip Switch Mode lets you customize the control panel with up to 15 of your own power-on settings.

Compatibility

Star's NX printers are Epson and IBM* compatible for use with most off-the-shelf software packages. Their standard parallel centronics interface with optional serial-to-parallel converter makes them simple to use with most personal computers. All are capable of high-speed, bi-directional printing at extremely low noise levels. And the two *RAINBOW* models—the NX-1020 and NX-2420—even offer printing in seven vibrant colors.

Color printing

Star has one of the largest selections of printers available for small businesses. So make sure you take a look at our new line of NX printers. They're engineered to give you the price-performance of a lifetime. To find out where you can get all the write stuff from Star, call 1-800-447-4700 now.

Low noise level

2-YEAR LIMITED WARRANTY

star®
THE COMPUTER PRINTER

*Epson is a registered trademark of Epson America, Inc. IBM is a registered trademark of International Business Machines Corporation. All features not available on all models.

CIRCLE NO. 255 ON READER SERVICE CARD.

25-line screen, the last two lines are pushed off the bottom of the screen, giving you two additional useful lines for viewing files.

Sprint

Track Sprint's Glossary

Sprint stores glossary entries in a file called STANDARD.SPG. If you make any changes to the glossary, when you exit Sprint you'll be asked, "Save changes to STANDARD.SPG?" If you respond by pressing Y, Sprint makes the changes and stores the revised STANDARD.SPG in the current directory, which may not be your \SPRINT directory. If you store Sprint files in several directories, you wind up having several glossary files, none of which is completely correct.

To avoid this situation, anytime you update the glossary when exiting Sprint, copy the STANDARD.SPG file to your \SPRINT directory if it wasn't the working directory when you exited Sprint. Then, delete STANDARD.SPG from the current directory. This ensures that you have only one glossary file, and that it's always the correct version.

If you are in the \SPRINT directory when you exit Sprint, then the glossary file is updated properly and you needn't do anything extra.

Ventura Publisher

Back Up Stylesheets

A fast way to back up a Ventura Publisher stylesheet without leaving the program is to use Save As New Style. Save the sheet under the current filename, but save it on drive A: or any drive other than the one from which you're running Ventura. Next, use Load Diff Style to reload the sheet from the hard disk. Reloading from the hard disk prevents the program from looking for the sheet on your other drive the next time you open the chapter.

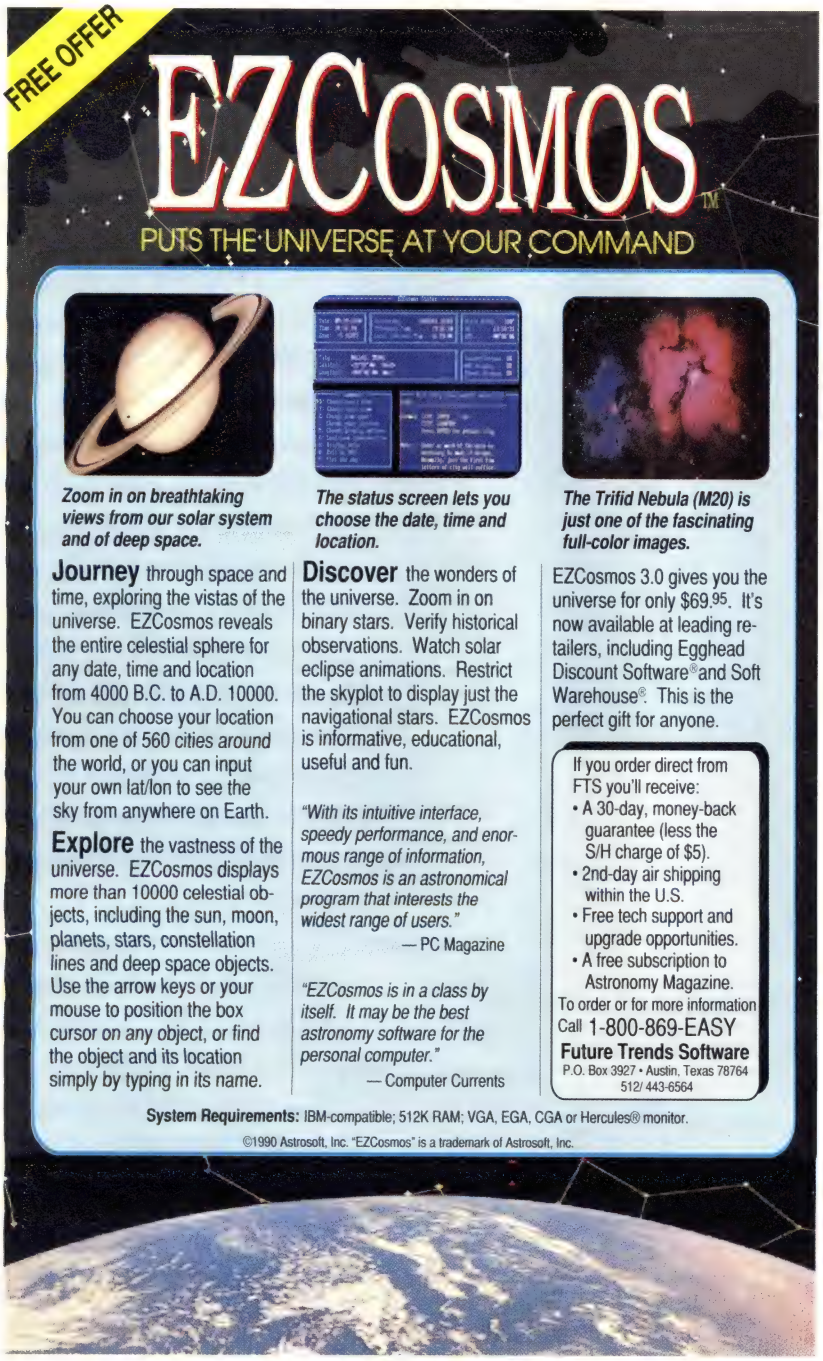
Quattro Pro

Hold Your Place

To inspect another part of a spreadsheet quickly without losing your current place, use F5, the GoTo key. When you press F5, Quattro Pro asks you which cell to move to. Instead of entering an address, use the arrow keys or the mouse to move to the place you want to see. You can move to view any area, but don't press Enter or execute any commands. When you want to return to the original position, press Esc.

Do you know *a better, faster, easier or more effective way to use software applications? Share it with us, and if we publish your secret, we'll pay you $50 and send you an "I've Got a Secret in* PC/Computing" *T-shirt. Send your tips, along with your name, address and daytime phone number, to Software Secrets,* PC/Computing, *Four Cambridge Center, Cambridge, Mass. 02142. Please include your shirt size: S, M, L or XL.*

Software Secrets contributed by George Beinhorn, Chris DeVoney, John Edwards, Judy Housman, Jack Nimersheim, Charles M. Olsen, Jan Watts, Ron White and Lamont Wood.



CIRCLE NO. 229 ON READER SERVICE CARD.

Draw attention to your work with the low-cost, color-ready Tandy® DMP 240 printer.

Let the Tandy DMP 240 bring your documents out of the dark ages. With *eight vibrant colors*, your work will stand out from those common shades of gray. Operating under DeskMate® software, as well as programs using the Epson® LQ Color Driver, the *24-pin* Tandy DMP 240 produces eye-catching text and graphics at your command. The *multi-function operation panel* makes the DMP 240 remarkably versatile and easy to use. A 2-line LCD display lets you set over 100 different printing combinations. Define printer settings just once, then load them with the touch of a button. *Programmable tear-off* lets you detach paper without wasting sheets. *Paper park* allows you to print single sheets without having to remove the fanfold paper, and the reversible tractor feed increases your printing options to include many different forms and papers. *Add a touch of color* to your work—anything else pales by comparison.

CREATING NEW STANDARDS

PROVEN LEADERSHIP

Over 7,000 USA locations, 39,000 employees, seven research and development centers, 31 USA and overseas manufacturing plants—NOBODY COMPARES!

GUARANTEED SATISFACTION

Over 35 million customers benefit annually from our satisfaction guarantee. Putting you first has made us #1 in PC compatibles—NOBODY COMPARES!

Radio Shack® AMERICA'S TECHNOLOGY STORE℠

Radio Shack is a division of Tandy Corporation. Epson/Reg. TM Epson America, Inc. Color ribbon sold separately.

CIRCLE NO. 226 ON READER SERVICE CARD.

The difference betw
fax board and

Intel's new SatisFAXtion™ fax board costs less than $500. And while that prices it well under some fax boards, there are still cheaper alternatives.

So we thought it only fair to explain what you'll be getting with ours.

Or, missing with theirs.

1. The SatisFAXtion board is the only one that lets you fax a document exactly as you'd send it to your printer. One step, five seconds, and you're back to work. There's no easier way to fax—period.

2. With the SatisFAXtion board you get true WYPIWYF™—what you print is what you fax. Text is never distorted, fonts never switched, formats never lost. You can even connect a scanner and fax photo-quality images with up to 256 levels of grey.

3. Once a fax starts coming in or going out, most boards bring the work your computer's doing to a screeching halt. Even a simple fax could tie up your PC for several minutes. But the SatisFAXtion board has its own dedicated 16 MHz microprocessor. All your faxing happens entirely in the background, so you and your PC don't skip a beat.

4. The SatisFAXtion board automatically configures and installs itself in your PC. Cheaper boards are a nuisance, with DIP switches, jumpers, and long, convoluted procedures to mess with.

5. If you ever have a question about your SatisFAXtion board, you can get answers directly from Intel experts—either by phone, fax, or modem.

6. Offices don't communicate by fax alone, so the SatisFAXtion board gives you a built-in MNP 5 modem that works twice as fast as ordinary modems. This alone is worth $300!

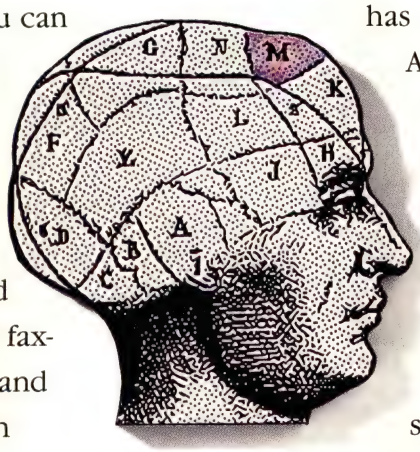
7. While cheaper boards hog over 100K of conventional memory just to send a fax—even if your PC has expanded RAM—the SatisFAXtion board needs as little as 9K.

Ordinary fax boards make you look this bad:

The *SatisFAXtion* board makes you look this good.

een an inexpensive a cheap one:

Which means you can easily fax from within even the most powerful, memory-hungry applications.



8. If you need help while you're faxing, just press F1 and follow the built-in directions.

9. Our board is covered by a 5-year warranty—more than twice as long as cheaper fax boards. (We'll leave it to you to figure out what that implies.)

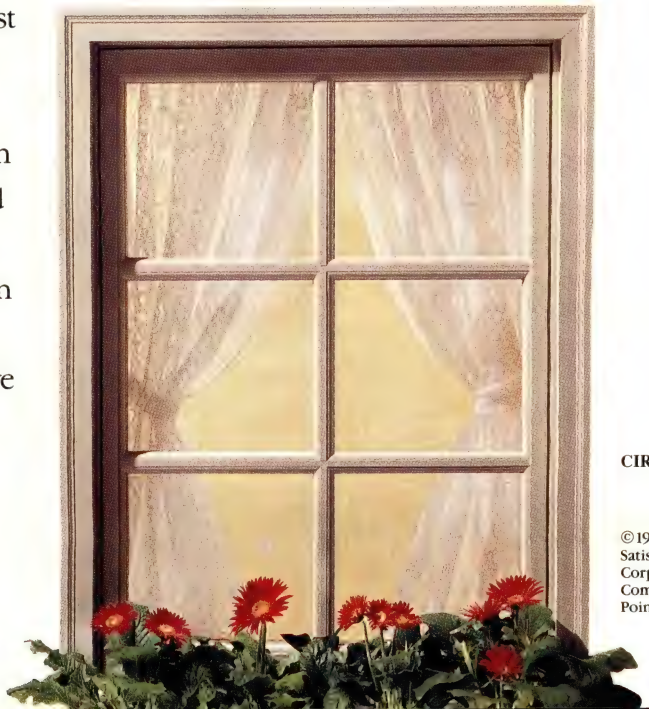
10. No other fax board is designed to run crash-free under Windows 3.0. Just load *FAXit® For Windows* software—which, by the way, is free to all SatisFAXtion buyers—onto your PC, and you can fax directly from any Windows 3.0 application that can print.

11. What more could we add to the fax board that has everything? Actually, quite a bit: For a limited time, when you buy the SatisFAXtion board you'll also get *PC Tools Deluxe*™ software free, as well as $100 worth of discounts on other PC hardware and software products.

If you'd like to learn more—and believe us, there's plenty more to learn—just call (800)525-3019 and ask us to fax you document #9997 Or call Intel customer service at (800)538-3373.

Suggested retail price of Intel's new SatisFAXtion board.

We think you'll find that the difference between a cheap fax board and an inexpensive one can really be summed up in one word: SatisFAXtion.



intel®

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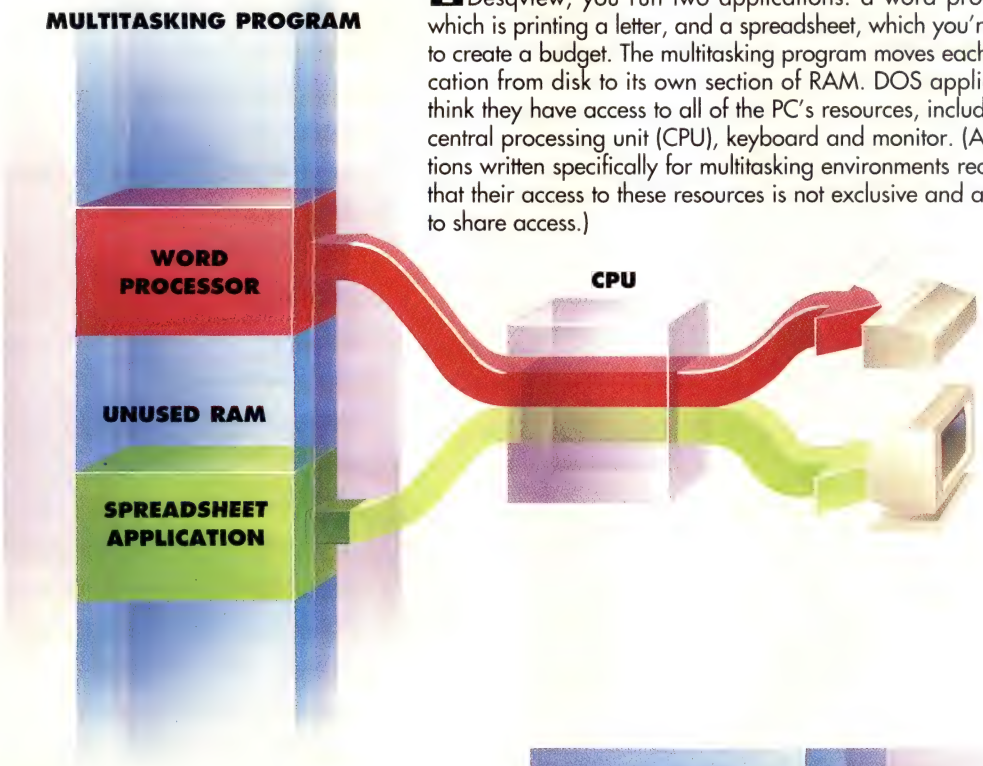
DOS Multitasking

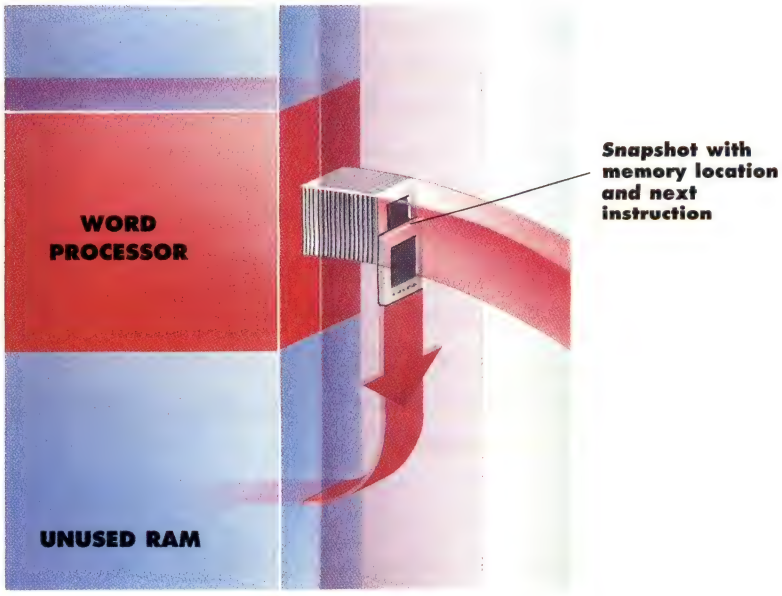
To "multitask" DOS applications, a PC lets them take turns using its CPU. Here's a second in the life of a multitasking environment. By Dale Lewallen

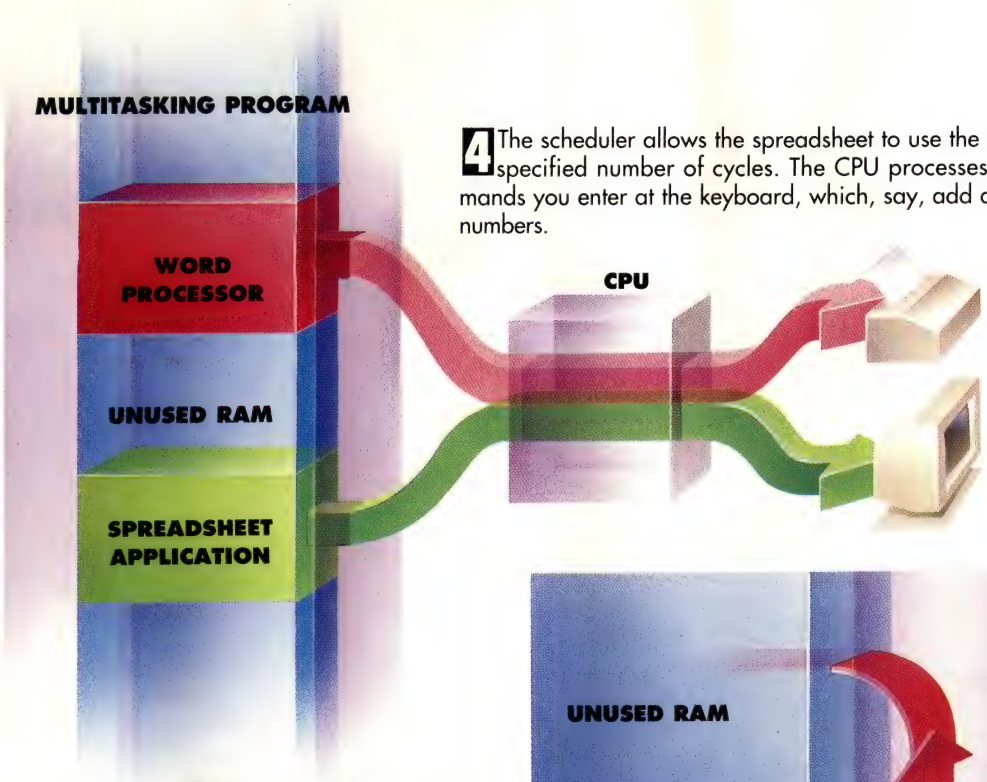
1 Using a multitasking environment, such as Windows 3.0 or Desqview, you run two applications: a word processor, which is printing a letter, and a spreadsheet, which you're using to create a budget. The multitasking program moves each application from disk to its own section of RAM. DOS applications think they have access to all of the PC's resources, including the central processing unit (CPU), keyboard and monitor. (Applications written specifically for multitasking environments recognize that their access to these resources is not exclusive and are able to share access.)



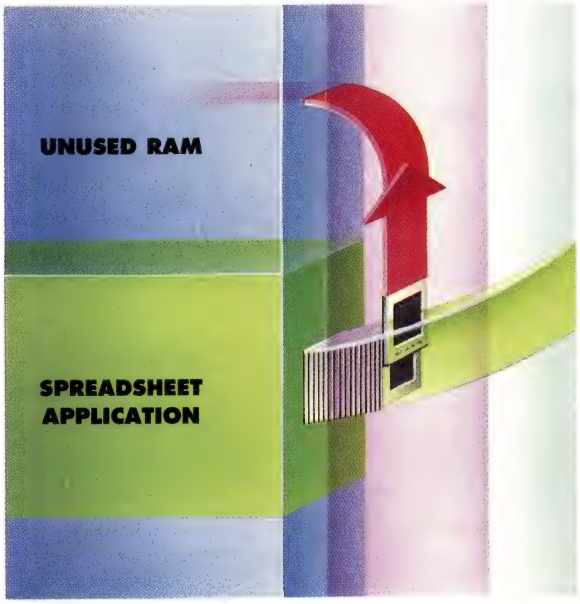
2 The scheduler, a component of the operating system software that allocates time for each application to run, lets the word processor send characters to the printer for a specified number of clock cycles, or fractions of a second.

3 The word processor consumes its allotted number of cycles. The multitasking environment stores in memory a "snapshot" of the word processor, which includes its memory location and the next instruction the CPU will need when it's time to resume this application.

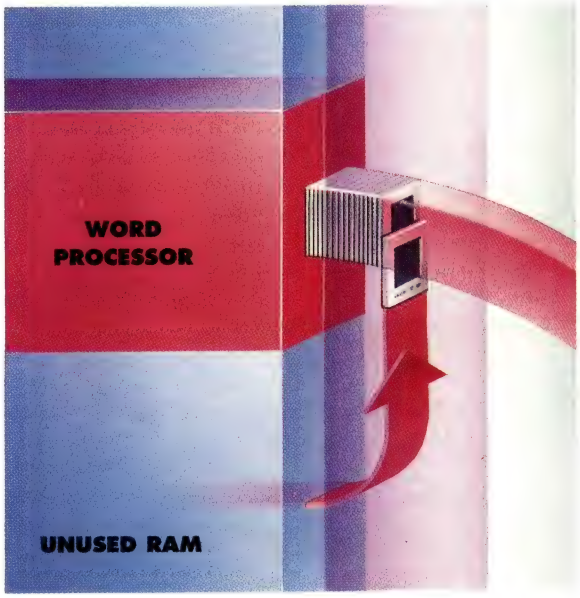




4 The scheduler allows the spreadsheet to use the CPU for a specified number of cycles. The CPU processes the commands you enter at the keyboard, which, say, add a range of numbers.



5 The spreadsheet uses its allotted cycles. The multitasking environment stores in memory the spreadsheet's memory location and the next instruction the CPU will execute for this application (the "snapshot") when it's run again.



6 The environment uses the word processor's snapshot information, stored in memory, to restore the word processor to its previous state. The scheduler tells the word processor to resume printing where it left off.

This entire process continues until you close one of the applications.

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Free hidden-file finder program • *Restore files backed up with any DOS version • The best uses for extended memory • Avoid floppy-disk upgrading snafus • By Jeff Prosise*

Hidden-File Troubles

I have two subdirectories on the hard disk of a PC-XT/286 that DOS won't let me delete. When I use the RD command, DOS replies that the directories are not empty. Yet there are no files in either directory. What's wrong?

PENG JIANG
NEW HAVEN, CONNECTICUT

There are probably hidden files in these directories. Hidden files are physically stored on the disk like normal files, but they don't show up when you type DIR.

Many shell programs will display hidden files. So will a number of public domain directory-display utilities. Create your own program with this series of DEBUG commands:

```
N HDIR.COM
E 0100 EB 2E 2A 2E 2A 00 4E 6F
E 0108 20 68 69 64 64 65 6E 20
E 0110 66 69 6C 65 73 20 66 6F
E 0118 75 6E 64 0D 0A 24 00 00
E 0120 20 5B 53 75 62 64 69 72
E 0128 65 63 74 6F 72 79 5D 24
E 0130 B4 4E B9 37 00 BA 02 01
E 0138 CD 21 72 0E E8 1E 00 B4
E 0140 4F CD 21 72 05 E8 15 00
E 0148 EB F5 83 3E 1E 01 00 75
E 0150 07 B4 09 BA 06 01 CD 21
E 0158 B8 00 4C CD 21 F6 06 95
E 0160 00 02 74 2F FF 06 1E 01
E 0168 FC B9 0D 00 BF 9E 00 32
E 0170 C0 F2 AE C6 45 FF 24 B4
E 0178 09 BA 9E 00 CD 21 F6 06
E 0180 95 00 10 74 07 B4 09 BA
E 0188 20 01 CD 21 B4 09 BA 1B
E 0190 01 CD 21 C3
RCX
0094
W
Q
```

The result is HDIR.COM, which scans the current directory for hidden files and subdirectories and displays a list of those it finds. If it doesn't find any, it responds with "No hidden files found." It also prints "[Subdirectory]" after each subdirectory's name.

Many copy-protected programs leave hidden files with odd names in their wake even after they're removed. HDIR will help you find them. Once hidden files are identified, use the UNHIDE utility that appeared in the August Q&A column to unhide them ("Do-It-Yourself Security," page 142). With their hidden-file attributes removed, these files can be deleted like normal files.

Disk Interleave

Can you explain how sector interleave affects disk speed, and how to alter it? Also, is there any way to change the interleave without reformatting my entire hard disk?

NANCY BRISBANE
SANTA CLARA, CALIFORNIA

Interleave is a technique used to optimize hard disk performance by matching the physical characteristics of the drive to the rate at which the system surrounding it (the controller, the bus, the CPU and other supporting circuitry) can process the data coming from and going to it.

The figure below shows the effect of sector interleave. Each diagram represents one cylinder of a hard disk containing 17 sectors per cylinder. With a 1:1 interleave ratio, sectors 1 through 17 appear in consecutive order. Consecutive sectors on a disk with a 2:1 interleave are spaced two sectors apart, those on a disk with a 3:1 interleave are spaced three sectors apart, and so on. The range of sector interleaves used in PCs today varies from 1:1 to 6:1, depending on the type of PC that the hard disk is installed in and how fast the hard drive is. Most 386 PCs can handle a 1:1 interleave, while XTs are typically formatted at 6:1. ATs fall somewhere in between, usually at 3:1 or 2:1.

Why interleaving? Most hard disks spin at the rate of 3,600 rpm. On a 17-

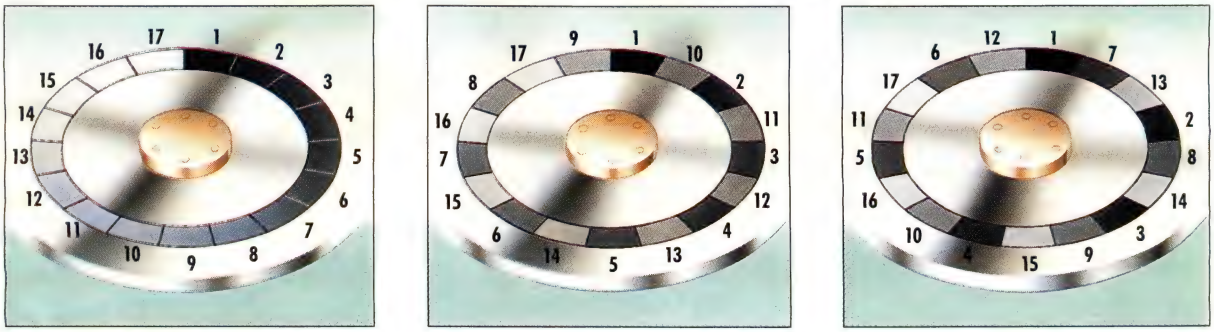

ILLUSTRATION BY CHUCK SLAWICH/CREATIVE IMAGES

Sectors are interleaved on a hard disk to match the physical characteristics of the disk to the performance of the hardware surrounding it, which can process data written to or read from the drive. Shown are 1:1, 2:1 and 3:1 interleaves.

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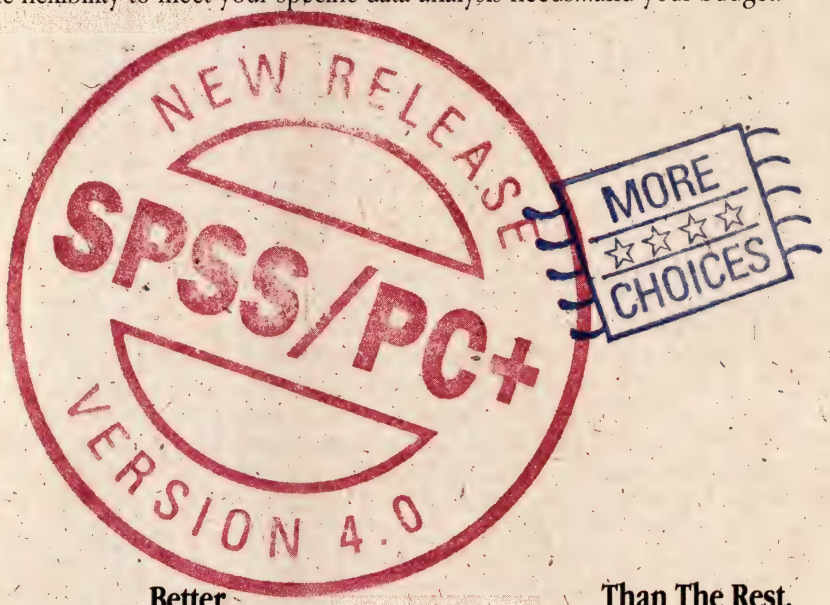

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444 North Michigan Avenue, Chicago, Illinois 60611

sector-per-cylinder disk, a new sector passes under the drive head every 1/1,020 of a second. If the controller reads two consecutive sectors from a disk with a 1:1 interleave and can't finish processing the first before the second one spins around, it has to wait until the disk makes another complete revolution to read the second sector. This imposes a severe performance penalty on reads and writes. A higher interleave value provides more time between sectors. Matching the performance of the drive to the PC, so that the next consecutively numbered sector reaches the drive head when the PC is ready for it, can significantly speed up your system.

Interleave is set during low-level formatting and normally can't be changed without destroying what's on the disk. However, disk utilities such as SpinRite II and The Norton Utilities Version 5.0 can perform low-level formats (applying new interleaves in the process) without erasing existing data. These products will determine the optimum interleave value. It's the best way to make sure you get the most out of your hard disk.

Synthesizers and MIDI

To your reply to Kenneth D. Williams regarding sound boards in the August issue ("PC Sound and Speech," page 149), I'd like to add that a Roland MT-32 synthesizer can't be attached to a PC without a MIDI interface, such as Roland's MPU-401 or MPU-IPC. These cards can be plugged into any empty expansion slot. The Roland LAPC-1 Sound Card is an alternative to purchasing separate cards, and it has everything you need.

JOHN R. GRANT
BOWIE, MARYLAND

The LAPC-1 ($595) combines a sound generator similar to the MT-32 and a MIDI interface on one card, providing everything you need for realistic sound from games and other programs that support the MT-32. One of the best collections of sound files for Ad Lib, Sound Blaster and MIDI music cards is available from Nelson Ford's Public (software) Library in Houston. Disk number 2387 contains an assortment of Christmas tunes just right for the season. Contact the Public (software) Library at (713) 524-6394.

RESTORE from Another DOS

In your July column, a reader asked how to restore files backed up with DOS 2.1's BACKUP utility to a hard disk running DOS 4.01 ("Restoring to New DOS," page 220). Canadian Mind Products' RESTORE utility is a direct replacement for DOS's RESTORE command, and it works across different DOS versions.

JACK ADRIAN
BUCKHANNON, WEST VIRGINIA

Thanks for mentioning this utility. This shareware version of the RESTORE program is compatible with DOS's BACKUP utility, and it works with files that have been backed up with any version of PC-DOS or MS-DOS from 2.0 through 4.01. The product costs $15 and is available from Canadian Mind Products, of Vancouver, which can be reached at (604) 684-6529.

Switch Printer Ports

Some of the programs I run don't allow a printer port to be designated, and so output goes to LPT1 by default. Sometimes, though, I would like to use the laser printer attached to LPT2. How can I do this?

JANET A. CARRA
SOLDOTNA, ALASKA

Eliminate the printer port problem by creating this small program called SWAPLPT. Create an ASCII file by typing the following listing and name it SWAPLPT.SCR.

```
N SWAPLPT.COM
E 0100 EB 24 53 57 41 50 4C 50
E 0108 54 03 01 00 00 00 00 9C
E 0110 2E 80 3E 0A 01 00 74 08
E 0118 83 FA 00 75 03 BA 01 00
E 0120 9D 2E FF 2E 0B 01 FC C7
E 0128 06 00 01 00 00 33 DB 8C
E 0130 C8 43 8E C3 3B C3 74 1B
E 0138 BE 00 01 8B FE B9 0A 00
E 0140 F3 A6 75 ED 26 80 36 0A
E 0148 01 01 26 8A 1E 0A 01 E8
E 0150 33 00 C3 B8 17 35 CD 21
E 0158 89 1E 0B 01 8C 06 0D 01
E 0160 B8 17 25 BA 0F 01 CD 21
E 0168 8A 1E 0A 01 E8 16 00 BA
E 0170 26 01 CD 27 0D 0A 4C 50
E 0178 54 31 20 3D 3E 20 4C 50
E 0180 54 78 0D 0A 24 80 C3 31
E 0188 88 1E 81 01 B4 09 BA 74
E 0190 01 CD 21 C3
RCX
0094
W
Q
```

Create the RAM-resident file SWAPLPT.COM by typing DEBUG < SWAPLPT.SCR at the DOS command line. The first time you run SWAPLPT, it will reroute everything from LPT1 to LPT2; run a

HOT TIP

Startup

At Last, a PATH Editor

If you're constantly adding and deleting applications, you're constantly modifying your AUTOEXEC.BAT PATH statement. Your PATH is a variable that DOS stores in a chunk of RAM known as the environment space. Unfortunately, you can't easily edit items stored in the environment. The following batch file, PE.BAT, makes it a snap to store your PATH statement in a batch file, which is easy to edit.

```
PATH > OLDPATH.BAT
PATH > NEWPATH.BAT
EDITOR NEWPATH.BAT
CALL NEWPATH.BAT
PATH
DEL NEWPATH.BAT
```

The first line creates a backup copy of your PATH by storing it in a batch file called OLDPATH.BAT. To reinstall the old version, type OLDPATH at the DOS prompt.

The second line stores a second copy of the PATH in NEWPATH.BAT. The third line invokes your ASCII text editor, EDITOR, and tells it to edit NEWPATH.BAT, which contains your PATH. Substitute the command that invokes your editor for EDITOR in the batch file. (This program assumes that your editor will load a file from the command line.)

After you've modified your PATH, exit EDITOR. PE.BAT executes NEWPATH.BAT, which uses the PATH command to install your new PATH. (If you have DOS Version 3.2 or earlier, substitute COMMAND /C for the CALL command.)

Line 5 displays your current PATH and line 6 deletes NEWPATH.BAT, which is no longer needed.

LUIS URIBE

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HOT TIP

Batch

Batch File Timer

Many batch files use the DOS PAUSE command to suspend their processing temporarily until the user presses a key to continue. If you don't press a key, the batch file hangs in limbo. Instead of PAUSE, use TIMER.BAT with your BASIC interpreter to continue a batch file if you don't respond within a given time.

Here's TIMER.BAT; indented lines are continuations of the lines preceding them and should be typed as one line.

```
ECHO OFF
ECHO 10 ON ERROR GOTO 120 >
   TIMER.BAS
ECHO 20 PRINT "%2 %3 %4 %5 %6 %7 %8
   %9" >> TIMER.BAS
ECHO 30 LET COUNT = %1 >> TIMER.BAS
ECHO 40 IF COUNT = 0 GOTO 120 >>
   TIMER.BAS
ECHO 50 LET STARTTIME = TIMER >>
   TIMER.BAS
ECHO 60 LET STOPTIME = TIMER >>
   TIMER.BAS
ECHO 70 WHILE (INT(STOPTIME) =
   INT(STARTTIME)) >> TIMER.BAS
ECHO 80 STOPTIME = TIMER >>
   TIMER.BAS
ECHO 90 WEND >> TIMER.BAS
ECHO 100 LET COUNT = COUNT - 1 >>
   TIMER.BAS
ECHO 110 GOTO 40 >> TIMER.BAS
ECHO 120 SYSTEM >> TIMER.BAS
GWBASIC TIMER.BAS
DEL TIMER.BAS
```

This batch file uses the DOS ECHO and redirection operators to create the BASIC program TIMER.BAS, which performs all the necessary processing, in your current directory. The batch file assumes that your BASIC interpreter is GWBASIC, located in a directory in your path. If GWBASIC is not in your path or if you use BASICA, change the second-to-last line to match your situation.

Whenever you run TIMER.BAT, include the number of seconds that you want your batch file to pause after TIMER.BAT's name. You can also include an eight-word message. Include the lines in TIMER.BAT as part of a batch file, or if you're using DOS Version 3.3 or later, invoke TIMER.BAT from within another batch file with the line:

```
CALL TIMER.BAT 10  What are you
   waiting for?
```

That example runs TIMER.BAT with a 10-second pause and displays the message entered after the number. If you're using an earlier DOS version, use the line:

```
COMMAND /C TIMER.BAT 10  What are
   you waiting for?
```

KRIS JAMSA

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second time, LPT1 output will be restored to LPT1; a third time, LPT1 will again be redirected to LPT2; and so on. Each time you run it, the program toggles LPT1 printer output between LPT1 and LPT2. And so that you don't lose track of which printer port is active, SWAPLPT displays a short message each time it's run, indicating where output will go.

Best Use for Extended RAM?

I recently upgraded my PC's RAM to 1MB. The lower 640K is usable by DOS; the remaining 384K is extended memory, which can't be used by DOS. How can I put this extra RAM to work?

WYETT H. COLCLASURE III
ATLANTA

There are several ways to use extended memory on 286 and 386 PCs. You can use it as a RAM disk using VDISK.SYS or RAMDRIVE.SYS, the virtual disk drivers supplied with PC-DOS and MS-DOS. You can use it to speed up disk accesses or spool print data with programs such as the Super PC-Kwik Disk Accelerator and PC-Kwik Print Spooler, both in the PC-Kwik Power Pak from Multisoft. Using utilities such as QRAM or QEMM 386 from Quarterdeck Office Systems or Move'Em or 386Max from Qualitas, you can convert extended to expanded memory (QRAM and Move'Em work on 286 systems; QEMM 386 and 386Max work on 386 systems).

You may also elect to use Quarterdeck's Desqview to add a windowed interface to your PC that knows how to use that extended memory. The added RAM will come in handy when you're trying to juggle multiple programs in memory.

But perhaps the best way to put this extended memory to work is with Microsoft Windows. On both 286 and 386 systems, Windows will put all the memory available in your PC to work holding application programs, data and buffers. In fact, you'll find that 1MB of RAM is barely enough; for optimum performance, particularly on 386 PCs, you'll want to add at least one more megabyte to complement the 1MB already installed.

For more information concerning the PC-Kwik utilities, Multisoft can be contacted at (503) 644-5644. Quarterdeck can be reached at (213) 392-9851, Qualitas at (301) 907-6700. For information on the latest release of Windows, contact Microsoft's Information Center at (800) 426-9400.

Format Failures

I recently swapped the 360K drive on my XT for a 3½-inch 720K drive. I can read and write 720K diskettes fine, but when I format a 3½-inch diskette in this drive, it's formatted as a 360K diskette. Is there a fix?

O. LEE BRANDHAGEN
FREDERICKSBURG, VIRGINIA

Try using the DRIVPARM command, which is featured in MS-DOS 3.2 and later versions. If the 720K drive is drive A:, add the following line to your CONFIG.SYS file:

```
DRIVPARM = /D:Ø /F:2
```

If the drive is B: rather than A:, change the /D:Ø to /D:1. If you use PC-DOS rather than MS-DOS, you'll have to use DRIVER.SYS instead, because PC-DOS doesn't support the DRIVPARM command. The command would be:

```
DEVICE = DRIVER.SYS /D:Ø /F:2
```

Again, substitute /D:1 for /D:Ø if the 720K drive is drive B:. And remember that DRIVER.SYS causes the drive to assume a new drive letter. If, for example, drive A: is the 720K drive and the highest drive letter in your system is C:, DRIVER.SYS would add a drive D:—the 720K version of drive A:. You'd have to get into the habit of typing FORMAT D: rather than FORMAT A:. You could still refer to it as drive A: for non-formatting purposes, however.

If neither DRIVPARM nor DRIVER.SYS works, you might need a BIOS upgrade. Check with your BIOS manufacturer to make sure that the brand and version you have support 720K drives. Also check that any dip switches and jumpers on the drive itself are configured for use with an XT.

HOT TIP

Hard Disk

Easy File Security

Use the ASCII "blank" character in your file and directory names to bar casual intruders from your important files.

To create a blank, hold down the Alt key and type 255 with the keypad—don't use the number keys on the top row of your keyboard. With some PCs, you'll need to press Shift-Alt and type 255 if the Num Lock key is not on. The result looks like a normal space character, but DOS, which doesn't accept a true space character in filenames, will accept the blank.

Use an Alt-255 blank as the last character of a subdirectory name you want confidential. If you create the subdirectory SECURE and enter an Alt-255 blank immediately following the last letter of the name, the blank won't appear in a directory listing, and the name appears to be SECURE. Commands such as CD \SECURE will fail. Without knowing the Alt-255 trick, an intruder cannot change to this directory from the DOS command line. But programs that let you change directories using a graphical tree, such as XtreePro Gold, can circumvent this trick.

To safeguard individual files, use an Alt-255 blank as the last character before the period in the filename. Again, the blank won't be visible when someone uses the DOS DIR command to produce a directory of your files. If your filename is SECURE .DOC, the file looks similar to SECURE.DOC. When an intruder enters a command such as TYPE SECURE.DOC, it fails—as does ERASE SECURE.DOC. This trick deters the casual intruder, but commands involving wildcards, such as ERASE *.*, will affect the doctored filename.

Be aware that most applications don't recognize a filename with the Alt-255 character in it. Rename the file to a more conventional name before using it from an application.

RONNY RICHARDSON

CHALLENGE SOLVED

In the July issue, Gerald Hammer asked how to boot his PC from drive B: to accommodate self-booting programs that come on 5¼-inch disks on a PC with a 3½-inch A: drive.

The answer came from Jim Vasek of Wheaton, Illinois: B:Boot, a product of

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YWSoft, P.O. Box 2231, Bloomington, Indiana 47402. B:Boot is a simple, easy-to-use program that lets you boot your PC from drive B:. It's a complete software solution that doesn't require additional hardware. B:Boot can be ordered direct from YWSoft for $19.90 plus $2 shipping and handling. YWSoft can be contacted at (812) 857-4772.

Several readers suggested switching the ribbon cables that connect drives A: and B: to the controller. Others offered solutions that were specific to certain brands of PCs. The YWSoft solution works across a range of PCs, and it doesn't require you to remove the cover every time you want to boot off an odd-sized diskette. Thanks for all the replies, and keep the answers coming.

CHALLENGE

As a technical writer, I need to make heavy use of ASCII characters such as Greek letters that are part of the PC's character set but that can't be entered directly from the keyboard. Is there any way to generate these characters in Microsoft Works without keying them in on the numeric keypad? My laptop doesn't have a keypad, so I can't enter the upper-order ASCII characters by typing in three-digit ASCII codes with the Alt key held down.

JAMES P. LODGE
BOULDER, COLORADO

Sounds like a problem begging for a solution from one of our readers. Do you have a method for entering upper-order ASCII characters in Microsoft Works that doesn't require a numeric keypad? If not, how about a public domain utility that might lend a hand? If you can help, drop a letter to us marked "December Challenge." If we publish your solution, we'll convey our thanks by sending you a *PC/Computing* "I Solved the Challenge" T-shirt. Be sure to include your shirt size: S, M, L or XL.

Do you need help *using your computer? Q&A provides practical advice on PC problems. Questions are selected on the basis of broadest interest. Sorry, but we cannot answer questions individually. Send your question, along with any screen printouts or other details that could help solve it, to Q&A, Help,* PC/Computing, *Four Cambridge Center, Cambridge, Mass. 02142.*

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COMMAND /C

Usage:

COMMAND /C *batch-file*

If you use DOS Version 3.2 or earlier, COMMAND /C invokes one batch file from within another and returns to processing the original batch file, a procedure called nesting. In most cases, this command performs identically to DOS's CALL, available in Version 3.3 and later.

If you don't use one of these commands, a batch file will run a second batch file and deposit you at the DOS prompt. Suppose you have a batch file called SK.BAT that loads SideKick and one called WP.BAT that loads your word processor. You want to load both with one batch file. This START.BAT won't load both programs:

```
SK.BAT
WP.BAT
```

After executing SK.BAT, the program terminates and returns to DOS without considering the second command, WP.BAT. This version of START.BAT lets you load both programs with one command, START.

```
COMMAND /C SK.BAT
WP.BAT
```

Combine COMMAND /C with other batch file commands when you want to perform more than one action on a file. The following batch file, SELDEL.BAT, combines the FOR and COMMAND /C commands to examine the contents of each file in the current directory and delete those you want deleted.

```
FOR %%I (*.*) DO COMMAND /C TDEL %%I
```

Next, create TDEL.BAT:

```
TYPE %1 | MORE
ECHO Press Ctrl-Break to save %1 or
ECHO to delete %1
PAUSE
DEL %1
```

COMMAND /C invokes TDEL.BAT for each iteration of the FOR command. If you hadn't used COMMAND /C, TDEL.BAT would have executed on one file and exited to the DOS prompt instead of returning to the original batch file to continue processing the FOR command.

(continued on other side)

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Batch Commands: CALL

CALL

Usage:

CALL *batch-file*

If you use DOS 3.3 or later, use CALL instead of COMMAND /C when you need to run one batch file from within another batch file and return to the original batch file to complete processing.

CALL offers advantages over COMMAND /C. The latter loads a second copy of COMMAND.COM, which creates its own environment space in RAM and allows the second batch file to execute. (The environment is a common storage area that programs can use to store and retrieve data.) This process uses RAM and, in some situations, causes you to run out of memory, preventing the second program from executing.

Loading a second COMMAND.COM and environment causes other problems. When the second batch file completes its processing, it unloads both itself and the environment it used from memory. If the second batch file is supposed to pass information back to the original batch file, the program fails.

For example, if you use a database manager that requires you to set an environmental variable so that the manager knows where to place temporary files, you can use CALL to execute one batch file that sets the variable from another batch file. Assume that DB.BAT is a batch file to establish the environment variable and then launch the database program:

```
SET TEMP=C:\DB\TEMP
CD C:\DB
DB
```

If BACK.BAT is a batch file to run a backup program after the database is finished, and if the backup program needs the same TEMP variable, you can include both in a master batch file such as this:

```
CALL DB.BAT
BACK.BAT
```

The CALL command will run DB.BAT, which sets the variable and runs the database. When the database is finished, BACK.BAT runs and accesses the same variable.

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STRIPIT.BAS Can Display, Print Any Non-ASCII File

You say your files aren't pure ASCII? Use STRIPIT to see what they're hiding. By William Barden, Jr.

ALL PURE ASCII files are made up of characters that can be displayed on the screen or printed without causing strange screen or printer reactions. Try to display a non-ASCII file, though, and your screen may suddenly clear, beep or repeat lines. Send that file to your printer, and it may suddenly switch to a tiny font or continuously eject 200 sheets of paper.

Files that have been downloaded from data communications services, forgotten or unknown files that may contain text that reveals their contents, or word processing files that haven't been converted to ASCII characters are only a few of the instances in which a user would find it handy to be able to display or to print all of the printable text in a file without the fear of provoking unpredictable reactions.

The program featured here, STRIPIT.BAS, accomplishes the task of filtering out non-printable characters quickly. A special feature of the program also allows you to filter out undesirable characters selectively. Although STRIPIT.BAS is written in the BASIC language, you don't have to know anything about BASIC to enter and use the program—it's a simple text entry operation.

How to Use STRIPIT

To run the program from the DOS prompt, change from the current directory to the directory containing the BASIC interpreter and the program file itself. The BASIC interpreter is called BASICA.COM or GWBASIC.EXE; on Tandy systems, you should look for a file called BASIC.EXE. (Change GWBASIC in the command example below to match the name of your BASIC interpreter.) An alternative is to add a new PATH and APPEND entry that will locate the BASIC interpreter and the STRIPIT.BAS file from any directory.

Once this is done, type the following command:

```
GWBASIC STRIPIT
```

This loads the BASIC interpreter program and starts the STRIPIT program. You'll then see:

```
File name:
```

Enter the name of the file to be displayed or printed, including the path if different from the current directory. If you wish to print the file, press the Ctrl key, the Print Screen key and Enter after the filename. This action redirects screen output to your printer as well. (Press the sequence again at any time to stop screen printing.)

Each line on the screen will represent a single line as found in the file, except that lines longer than 80 characters wrap to a new line on the screen. During printing, long lines may be formatted into more than one print line, depending on the automatic operation of your printer (a LaserJet printer, for example, may discard characters beyond the margin in certain modes).

Once the file has been displayed and (optionally) printed, you will see the "File name:" prompt again. You can then view another file or press Enter to return to DOS.

If you've specified a name of a file that doesn't exist, the "File name:" prompt will reappear.

How to Create STRIPIT

To create the program, change to the directory containing the BASIC interpreter (often C:\DOS). Use a text editor to enter the following lines into a file called STRIPIT.BAS. (Indented lines are continuations of the previous lines; type them as one line.)

```
1 INPUT "File Name: ", NAM$: IF NAM$=""
   THEN SYSTEM
2 ON ERROR GOTO 8
3 OPEN NAM$ FOR INPUT AS #1
4 WHILE NOT EOF(1): LINE INPUT#1, A$
5 FOR I=1 TO LEN(A$): B$=MID$(A$,I,1):
   B=ASC(B$)
6 IF (B>31 AND B<129) OR (B>127 AND B<128)
   THEN PRINT B$;
7 NEXT: PRINT: WEND: GOTO 1
8 PRINT "File not found": CLOSE: RESUME 1
```

Customizing STRIPIT

Currently, the program discards all characters that are not printable ASCII characters. All extended ASCII characters (foreign symbols, line-drawing characters and so on) are also displayable on the screen or on IBM-compatible printers. You can selectively allow a block of characters to be displayed or printed by changing line 6 of STRIPIT. Change 127 and 128 to a lower limit and upper limit for characters that you want to include.

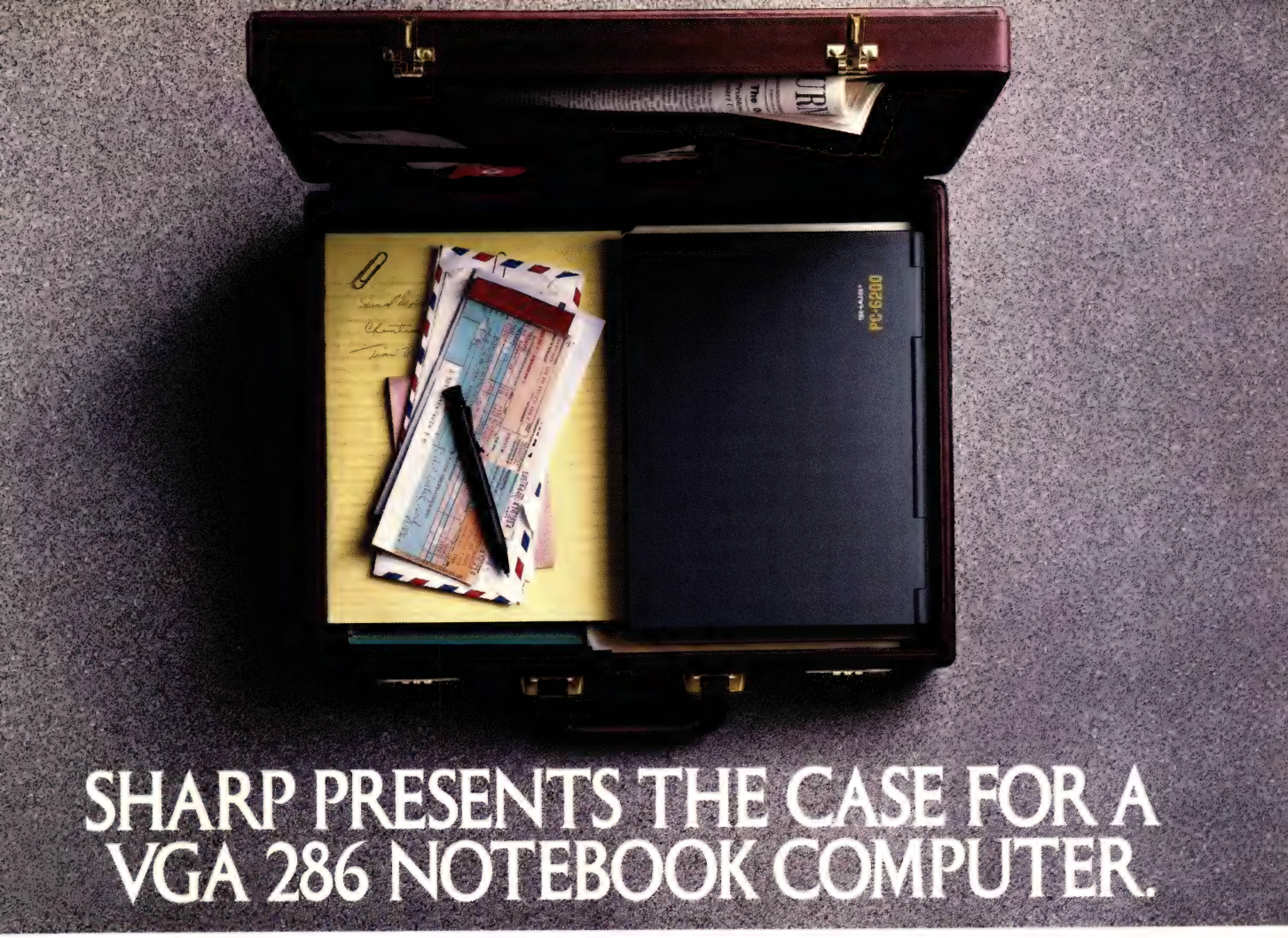
All files consist of bytes representing values from 0 through 255. Word processing files generally consist mainly of text characters, with some special formatting codes peculiar to the word processing program.

ASCII character codes from 32 to 127 represent uppercase and lowercase letters, numerals and some special symbols. Character codes below 32 represent "control codes" that relate to page and display formatting commands such as line feeds, carriage returns, top of page and tabs. Other control codes relate to communications functions and are not translatable to printing functions. These are the codes to be avoided in displaying or printing files.

Code numbers from 128 through 255 represent special "extended" ASCII codes that are not standard in the entire computer industry but that were established as standard characters on IBM-compatible systems. Many of these are Greek characters, line-drawing and shading characters and mathematical symbols.

Different word processing programs use different codes, either in the extended characters from 128 through 255 or in certain control codes, to represent functions such as boldface, underline and format changes. When displaying or printing word processing files, it's usually a good idea to avoid printing these special codes, and that's what STRIPIT does for you.

William Barden, Jr., is a PC consultant and the author of more than 30 computer-related books.



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CIRCLE NO. 243 ON READER SERVICE CARD.

DOS Can Be Dangerous, So Handle with Care

A commonsense guide to safe use of DOS's trickier commands. By Chris DeVoney

DOS PUTS AN arsenal of potent commands at your fingertips. The power of these commands becomes painfully obvious when you're rushed or careless and an errant keystroke sends valuable data to never-never land. Here's how to prevent misfires when using DOS's most dangerous commands.

ERASE and DEL: These two commands don't tell you which files they are deleting before they delete them. Just enter the wrong drive, path or filename or use the wrong wildcard name, and your data will disappear.

Solutions: Be sure that your DOS prompt displays the current PATH and directory so you know which files you're erasing. If your screen doesn't display this information, use the command PROMPT PG. With the current directory displayed at the prompt, you can use ERASE *.* (which erases all files in the current directory) with more confidence.

When deleting a filename containing DOS wildcards (? or *), use the following batch file, TESTDIR.BAT. It displays a directory of the files that will be erased and gives you a chance to interrupt the process before the files are deleted. Indented lines are continuations of previous lines; type them all on one line.

```
@ECHO OFF
DIR %1 /W
ECHO: If you don't want to continue the
   erase operation
ECHO press Ctrl-C. Otherwise...
PAUSE
DEL %1
```

If you use DOS Version 4.0 or later, add the /P switch (pause-and-ask) to the end of your DELETE instructions so that you can confirm whether each file should be deleted.

If you do erase the wrong file, don't store another file on that disk. Use a commercial unerase program, such as PC Tools ($149 from Central Point Software, 800-888-8199 or 503-690-8090), immediately. If you save any other files before attempting an unerase, the chances of recovering your data will decline significantly.

FORMAT: The FORMAT command is more deadly to floppy-based data than to hard disk files. Once a diskette has been reformatted, all data on the diskette is lost completely. Accidentally reformatted hard disks are recoverable only with great effort and the use of third-party programs, such as PC Tools.

Solutions: With floppies, always double-check the contents of the diskette that you plan to format and the disk-drive name that you offer the FORMAT command. Use the DIR command to check the diskette, including both the root directory and any subdirectories, for useful files.

With hard disks, if you use any version of DOS 2, always provide a disk-drive name with the FORMAT command and double-check the displayed message "Press any key to format the disk in drive *X:*". The *X:* is the disk drive that FORMAT will operate on. Hit Ctrl-Break if the wrong drive letter appears.

DOS Versions 3.0 and later warn you when they are about to format a hard disk by displaying such messages as: "Warning! All data in non-removable drive C: will be destroyed. Proceed with format (Y/N)?" If you intend to format a floppy disk, hit Ctrl-Break or answer no (N) immediately. If you intend to format a hard disk, double-check the drive letter in the message before proceeding.

For DOS 3.2 and later, put a volume label on all hard disks. FORMAT insists that you enter the current volume label before proceeding. Accidentally reformatting a hard disk with a volume label is difficult.

Never format a diskette involved in an ASSIGN, JOIN or SUBST command.

RECOVER: The RECOVER command is schizophrenic. Use it only to salvage a file with a bad sector. Never use it on an entire disk. If you do, you risk losing, rather than recovering, data.

Solution: Always provide a filename when using RECOVER. Absolutely avoid giving no name or just a drive name. (For more information on RECOVER, see page 253 in the March 1990 issue.)

COPY: The COPY command is normally benign unless a file on the destination disk and directory happens to have the same name as a source file. In this case, COPY overwrites the destination file, then copies the source file. The technique is great when replacing an outdated copy of a file. Unfortunately, when unrelated files have the same name, the wrong file is destroyed without warning. The problem occurs most often when a wildcard is used in the source filename.

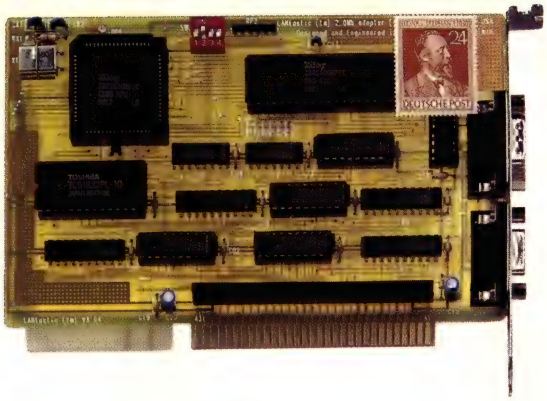
Solutions: The following batch file, SAFECOPY.BAT, looks for a file in the source directory with the same name as the file you are copying to. If a duplicate filename exists, the batch file warns you.

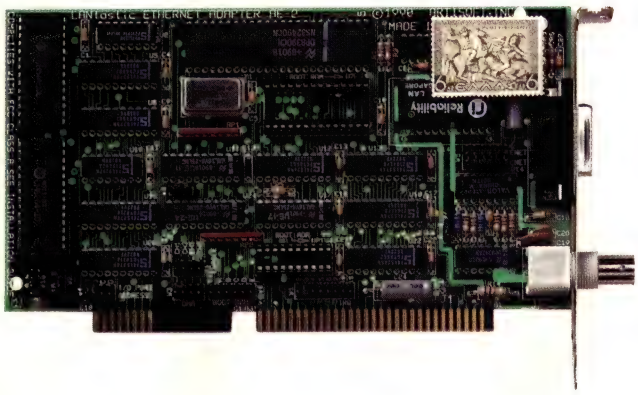
```
@ECHO OFF
IF "%2"== "" GOTO ERROR
IF "%2"== ".." GOTO ERROR
IF "%2"== "." GOTO ERROR
IF EXIST %2 GOTO DUPE
COPY %1 %2
GOTO END
:DUPE
ECHO A file named %2 already exists.
ECHO Use the COPY command if you really
   want to copy over %2.
PAUSE
GOTO END
:ERROR
ECHO You must specify a target filename.
ECHO Try again.
PAUSE
:END
```

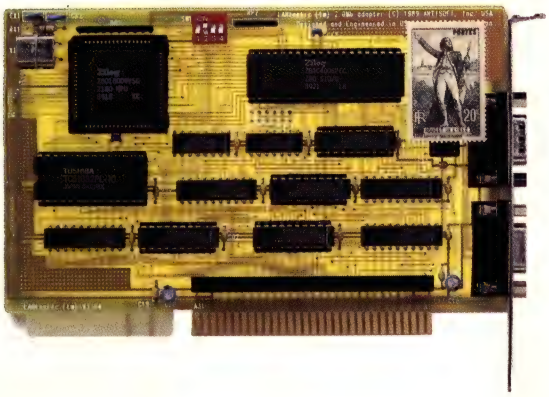
SAFECOPY is helpful only if you copy one file at a time. Using wildcards or simply copying to a directory or drive without the name of the source file produces an error message. In those cases, your best hope is to use the DIR command with the destination filename, then perform a DIR command on the source drive and compare the two directory listings for duplications. Here's a batch file, CHCKDUPE.BAT, that makes checking for duplicates easier:

```
@ECHO OFF
IF "%3" == "PRN" GOTO PRINT
IF "%3" == "prn" GOTO PRINT
DIR %1 /W
```

(continued)







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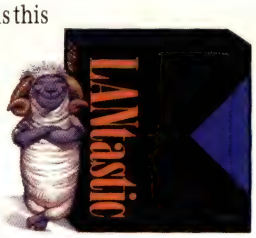

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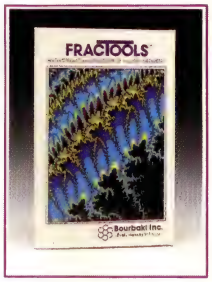

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CIRCLE NO. 149 ON READER SERVICE CARD.


```
DIR %2 /W
ECHO If you see duplicate files you don't
   want to copy over, press Ctrl-C.
ECHO Otherwise...
PAUSE
:MAKECOPY
COPY %1 %2
GOTO END
:PRINT
DIR %1 /W > PRN
DIR %2 /W > PRN
ECHO Check printout for duplicate files.
ECHO If you see files you don't want to
   copy over, press Ctrl-C.
ECHO Otherwise....
PAUSE
GOTO MAKECOPY
:END
```

To use CHCKDUPE.BAT, enter its name followed by the two drive/directories involved in the copy operation:

```
CHCKDUPE A: B:
```

If the directory lists are too long to see them onscreen at once, press Ctrl-C and reissue the command with PRN tacked onto the end. For example:

```
CHCKDUPE A: B: PRN
```

This sends the directory lists to your printer. If you see files that you don't want copied, press Ctrl-C. Otherwise, press any key and the copy operation will proceed.

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Chris DeVoney is a consultant and the author of several books, including DOS Tips, Tricks, and Traps.

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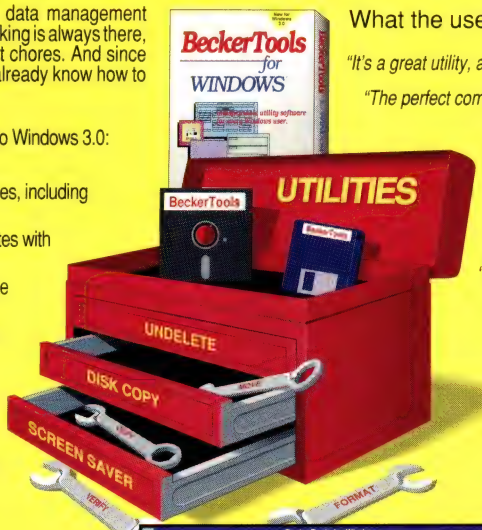

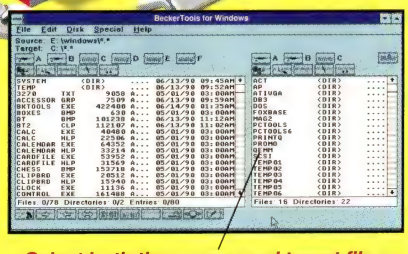

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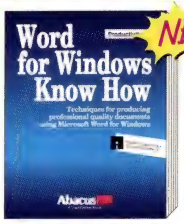

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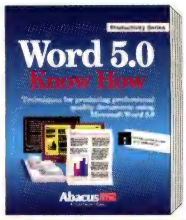

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CIRCLE NO. 182 ON READER SERVICE CARD.

Have It Your Way When You Start Windows 3.0

Mold the environment to the way you work by starting it with your favorite applications. By Craig Stinson

ONE OF THE pleasures of working with Windows programs is that there's nearly always more than one way to get something done. There are a number of ways to manipulate application and document windows, the basic working units of the environment. For example, to quit an application (or Windows itself), you can use the application's own Exit command (it's usually on the File menu), or pull down the Control menu and choose Close. Or press Alt-F4 or double-click on the application's control-menu icon.

If you'd like Windows to load with a certain configuration, you can mold the environment to the way you work. Here are some alternative ways to start Windows so that particular applications are brought to the desktop automatically.

Using the WIN Command

One way to start Windows with your favorite program in place is to include the program's name as a DOS command-line parameter. To start Windows and Polaris PackRat, for example, type:

```
WIN PACKRAT
```

You don't have to include your program's extension, but you do need to make sure Windows can find the program. In this example, if PACKRAT.EXE were not stored in your Windows directory—or in another directory included in your DOS path—you'd need to include a pathname before PACKRAT. When you start Windows with a command-line parameter, the system itself comes up faster because it skips its opening logo screen. You can take advantage of this, even if you don't want to start with an open application. Try typing:

```
WIN PROGMAN
```

If you're using Program Manager as your default Windows shell—the program that begins and ends Windows sessions—starting Windows with PROGMAN as a command-line parameter saves time—and you won't see Microsoft's name every time you boot Windows.

You can start either a Windows or a non-Windows program with a command-line parameter. You can also launch Windows with a document file in place, provided the file's extension has been *associated* with a Windows application. Suppose you have a file named TODOLIST.TXT. At the C: prompt you type:

```
WIN TODOLIST.TXT
```

Windows then opens Notepad, and Notepad loads your to-do list, because files with the extension .TXT are automatically associated with Notepad. The Windows Setup program establishes this association for you when you first install the environment. (Setup creates several other similar associations, and you can add as many as you please with the help of the Windows File Manager.)

A few—not many—Windows applications can be started directly as DOS commands. If you type EXCEL at the C: prompt, for example, Excel itself will start Windows and then start itself.

Start Programs Automatically

If you use a certain program or group of programs every day, take advantage of a procedure that lets you launch those programs automatically. Make a small modification to WIN.INI, one of the files in which Windows stores configuration information.

Since WIN.INI is a crucial file—as important to Windows as CONFIG.SYS is to DOS—make a backup copy before you even open it up to look at it. If you have File Manager handy, use it to copy WIN.INI. Or double-click on the DOS Prompt icon in Program Manager's Main group and, at the prompt, type:

```
COPY WIN.INI WIN.BAK
```

Then type EXIT to return to Windows.

With WIN.INI safely backed up, pull down Program Manager's File menu and choose the Run command. In the dialog box, type SYSEDIT.

SYSEDIT.EXE is a little gem that the Windows Setup program hides on your hard disk. It brings up four important configuration files in an editing program that works just like Notepad. One of these files is WIN.INI.

Double-click the title bar of the window named WIN.INI and look for a line near the top of the file that reads:

```
run=
```

(If you don't see it, use SYSEDIT's Search command to find it.) Click the mouse to the right of the equals sign, then enter the names of the programs you want Windows to start automatically, leaving a space between each name. Name as many as you like within the limits of your system's memory. For example, if you want to start Excel, Notepad and the Norton Commander each time you load Windows, make the line read:

```
run=EXCEL NOTEPAD NC
```

Then use SYSEDIT's Save command to store your modified WIN.INI. Your changes will take effect the next time you start Windows.

Note that you can start non-Windows as well as Windows programs this way, and that you don't need to include the extensions. (For non-Windows program names without extensions, Windows will look through your path for a file with the extension .PIF; if there's no .PIF file, it will look for an .EXE, .COM or .BAT file.) You can also specify document files associated with Windows applications.

Programs launched via the run= line in WIN.INI appear in open windows. If you want them to start minimized, put their names on the WIN.INI line that begins with load=. You'll probably find that line directly above the run= line.

When you start programs with either WIN.INI line, you still have to look at "Microsoft" emblazoned on your screen. Fortunately, you can combine the command-line and WIN.INI methods. So if you start Windows with a command in your AUTOEXEC.BAT file, you might as well make that command read WIN PROGMAN, even if you also use the run= or load= line. You'll add valuable seconds to each working day. ◪

Craig Stinson is a contributing editor to PC/Computing *and co-author of* Running Windows *(Microsoft Press).*

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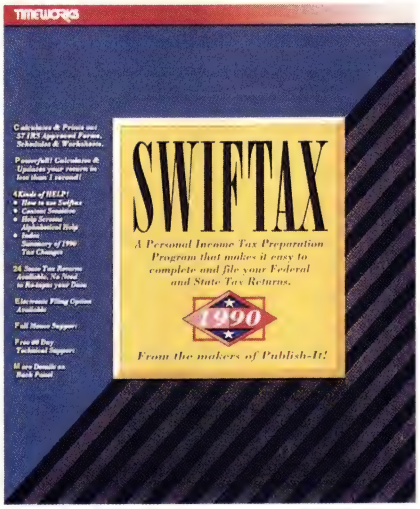

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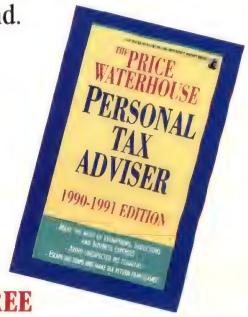

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CPU Specifications Denote A Chip's Speed and Power

Chip manufacturers use a variety of terms to describe the design, speed and power of a central processing unit (CPU) chip.

RISC: "Reduced instruction set computer" is a design term describing a type of chip construction. The theory behind the RISC chip is that many of the instructions used to perform tasks in a program are redundant, and that a chip designed to use only a certain subset of instructions will operate faster. RISC chips have only about 50 to 75 instructions built in.

If the chip needs to accomplish something more complex than the built-in instruction set allows, the software compiler or assembler that created the software program must use a series of simple instructions to mimic the effect of one complex instruction. For example, if you want to divide one number by another with a RISC chip, your compiler must execute the command with a series of repetitive addition or subtraction statements. On the other hand, a CISC-based (see below) PC has a Divide instruction programmed into the chip.

In many cases, a RISC chip is cheaper to produce than a comparable CISC chip. Unfortunately, RISC technology off-loads much of the processing responsibility to the software and increases the burden on compiler and assembler vendors, who must design more complicated software development tools.

RISC chips are most commonly used in workstations, such as IBM's new RISC System 6000 line, but the technology is also moving into the PC arena. Intel's new 80486 chip, discussed below, powers the fastest PCs and employs some RISC design features to improve its performance.

CISC: A complex instruction set computer—pronounced "sisk"—is the opposite of a RISC-based computer. Unlike RISC machines, CISC computers contain up to 300 instructions. All of Intel's line of general-purpose CPU chips are CISC chips, with the exception of the 486, which is a RISC-CISC hybrid, and the i860. Both chips utilize pipeline processing (see below), to execute certain frequently used instructions simultaneously in a single clock cycle.

Megahertz: The most common measure—expressed in millions of hertz (MHz), or cycles per second—of the speed at which the computer's clock operates. The clock in the PC is important for far more than just keeping time: It keeps track of the speed and synchronization of all basic operations inside the computer. For example, the original IBM PC with an 8088 CPU operates at 4.77MHz, while Intel's latest version of the 486 runs at both 25 and 33MHz.

MIPS: Millions of instructions per second, the rate at which a computer can carry out instructions. Commonly used as a measure of system power, the number is deceiving, since vendors can choose to evaluate their systems under widely varying circumstances. One measures MIPS based on best-case conditions; another might gauge it based on a heavy processing load. The rating has become a generally unreliable figure and has spawned sarcastic acronyms such as "Mis-Information to Promote Sales" and "Meaningless Instructions Per Second." Therefore, take any MIPS figure with a large grain of salt.

Pipeline processing: A feature generally associated with RISC chips that allows the chip to carry out several tasks simultaneously. This feature is used in the Intel i486 chip to increase its performance characteristics. This feature gets its name from a conceptual pipe, with all stages of the pipe executing at the same time. For example, with pipelining, a chip can be decoding one instruction at the same time that it is executing another and fetching (loading) a third. Using pipeline processing, the Intel i486 processor can process several low-level instructions in a single clock cycle, enhancing the overall performance of the computer. **DALE LEWALLEN**

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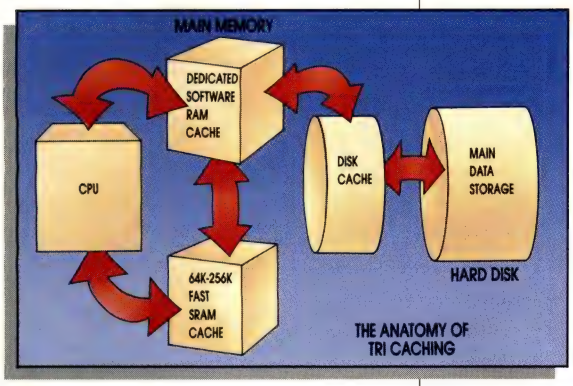
Caching guarantees power computing into the 90's! Northgate uses three types of caching technology to extend total system performance. Each system has a minimum of 64K SRAM memory cache, 32K-64K cache hard disk controllers and caching software—all for enhanced performance and speed.



SRAM Memory Cache! Northgate uses high-speed 64K-256K static SRAM cache to buffer frequently requested data from slower memory storage areas. RAM cache reduces the main processor's idle time (wait stage) while data is transferred to and from main memory. Our external 486 SRAM cache operates in true burst mode for 33Mb/second execution of instructions. Boosts the hit rate for data finding to 99%!

Hard Disk Caching Controllers! Disk caching improves performance by relieving the bottle neck caused by hard drives. When reading and writing to hard disk, the information passes through a RAM cache buffer. This buffer retains data after it has been sent to its destination. If the same data is needed again, it is drawn from the cache instead of the disk. Result? Accelerated I/O transactions!

Caching Software! Northgate uses disk caching software for enhanced performance. Here's how it works. During a session the software "learns" to anticipate what data you'll need next and brings it into the cache for quick retrieval.

Industry's most powerful components and peripherals!

System speed is not based on the CPU alone. Hard drives, floppy drives, video cards and other peripherals all play a part in enhancing overall performance. One slow element slows the whole system down. Northgate solves this problem by using the latest in AT interface technology to maximize system performance.

Hard disks made just for Northgate customers—fastest in the world! For Northgate (and you!) only the fastest hard drives will do. Our complete selection of hard drives—featuring our exclusive Maxtor 200Mb—use AT technology with disk caching controllers for fast, efficient throughput.

Fastest video combinations on the market—screens appear almost before you release "Enter"! Northgate's 16-bit Super VGA lets you zip through desktop publishing, windowing and other bit-mapped graphics operations. Select from our broad range of high performance monitors and video cards to meet the most demanding design and engineering applications!

Now ... performance software unleashes the power of your Northgate!

To make the most of our awesome power, we're including FREE performance software with our Elegance™ 386™ and 486™ Power User's systems. This $1139.00 suggested retail value includes Microsoft® Windows™ 3.0, Samna® Ami™ Professional word processing and Informix® Wingz™ graphics spreadsheet.

Microsoft® Windows™ 3.0!

You've heard about the point-and-click ease of Apple computing. Now Windows brings it to the DOS world! Windows speeds through even the most demanding 32-bit software ... makes program operation and multi-tasking a breeze!

AmiPro™—word processing and desktop publishing in one!

You get sophisticated word processing features including 130,000 word spell check, dictionary, thesaurus, search and replace, editable page views, multiple fonts, integrated graphics and more! And you get the look and feel of expensive desktop publishing packages!

Wingz™—powerful graphics spreadsheet and database program!

Wingz for Windows 3.0 is the first spreadsheet program that lets you take full advantage of today's powerful windows/graphics based environments. You get unsurpassed number-crunching power and page perfect presentations.

FOR MORE INFORMATION,
CALL TOLL-FREE 24 HOURS EVERY DAY

800-548-1993

Notice to the Hearing Impaired: Northgate has TDD capability. Dial 800-535-0602.

NORTHGATE COMPUTER SYSTEMS *"We hear you!"*

7075 Flying Cloud Drive, Eden Prairie, MN 55344

New Northgate® Elegance™ 486i™ System...

"Editors' Choice" said *PC Magazine*!*

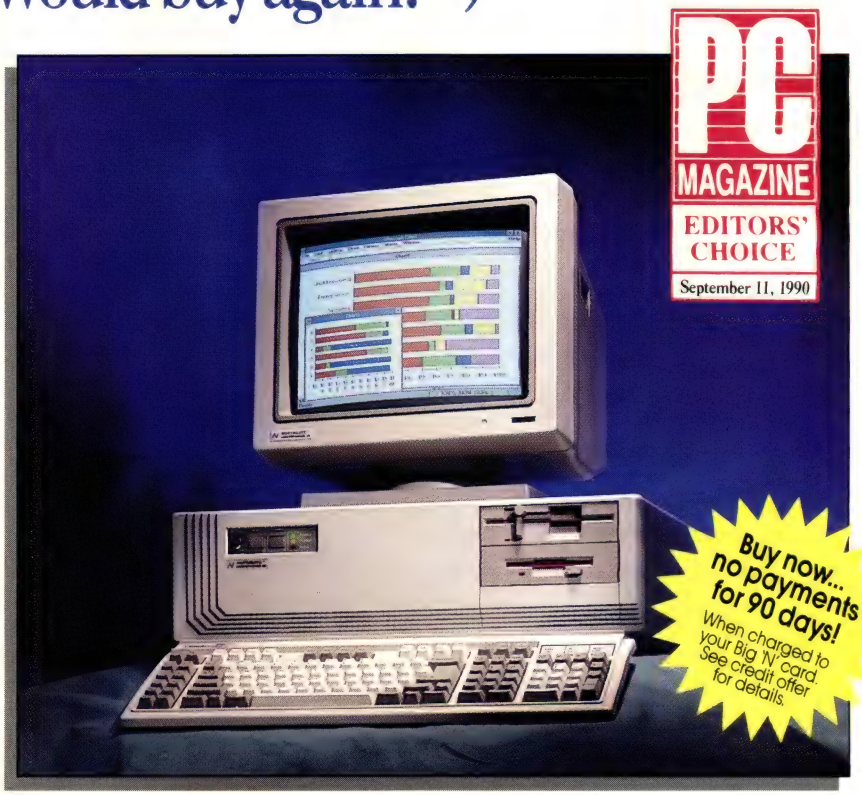
(Adding: "Northgate stops at nothing to please its customers...97% would buy again!"**)

InfoWorld labs scored it 9.1–top rating ever!†

Incredible power and unmatched performance at a price you'd expect to pay for a 386™!

$5895.00

Delivered to Your Home or Office



Whether 80286, 386 or 486 technology, Northgate consistently brings you top rated systems. Our value and performance is unexcelled when you look at the experts' opinions. Northgate is a company in which you can place your trust — perhaps our most important advantage!

In January, 1988, Northgate won its first Editors' Choice for the 286/12 SuperMicro. Northgate leadership prevailed again when *PC Magazine* benched 386 systems. One couldn't do better. Three Editors' Choice — one for each speed in our Elegance line of 20, 25 and 33MHz systems. Northgate is the only company who can make this claim!

***PC Magazine* then called for 486 ISA systems** for review. Result: there was no question about it. "Only one machine stands out," they said, "you could pay less for a 486 system, but not get the bonuses that are offered with the Elegance."*

Along the way, we added another Editors' Choice of our *OmniKey*® keyboard. There you have it ...

A record five Editors' Choice Awards in one year's time!

About the same time, the tough testers at *InfoWorld* were thoroughly and methodically examining Elegance 486i. They reported you could buy the next highest ranked system (scoring 8.2 vs. our 9.1) **but you'd also pay three times as much!**†

***InfoWorld's* editors concluded** that Northgate's 486i "leads the pack by a comfortable margin. It offers impressive performance, exceptional expandability and it is tops in support and value."†

InfoWorld showed Elegance 486i leading the pack again as a network file server and stand-alone system as well.

And, as if we had planned it, *PC Magazine* came along with its Service and Reliability issue in which Northgate's dedication to customer support was well evidenced. "As we learned more about its service policies, it became clear that Northgate stops at nothing to please its customers." No wonder "Northgate was the hands-down winner when it came to customer loyalty."**

That's the story. Designed and built to perform. Proven by the industry's most demanding testing. Fairly priced. And backed by people with a passion to serve you with a support policy that inspired one magazine columnist to say:

"What WordPerfect is to software support, Northgate is to hardware and there are even a few things that WordPerfect could learn from the folks in Minneapolis. Northgate is fast becoming the Nordstrom of the computer world."††

NOW! Northgate leads the pack again with a new 60-day no-risk trial!

The secret to Northgate's state-of-the-art power! The 486 processor combines the capabilities of an enhanced 386, an advanced internal cache controller and 8K of supporting static cache memory. The chip also incorporates an enhanced 387 FPU (Floating Point Unit). You get increased performance for the most demanding math-based applications.

Northgate caching enhancements give you greater speed! We've added a 64K read write-back SRAM cache (Northgate exclusive 256K system available) to further accelerate the execution of instructions. I/O transactions are faster than ever thanks to a 32K hard drive cache controller. Finally, we armed Elegance 486/25 with Smartdrive DOS disk caching software. Result? Processing speed you must see to believe!

Elegance 486i ISA is the perfect high performance graphics/software workstation or network server. Its multi-stage caching is an excellent match for tough number-crunching operations.

Look at everything you get! Elegance 486i comes complete with the spectacular Maxtor 200Mb "PowerMax" super-fast hard drive! This Northgate exclusive hard drive operates so quietly only the flashing red light tells you it's running.

PLUS, you get 4Mb of RAM, 1.2Mb 5.25″ and 1.44Mb 3.5″ floppies, desktop case, 14″ monochrome monitor, exclusive *OmniKey*® keyboard and Microsoft® Windows™ 3.0.

Elegance 486i ISA System Features

- 25MHz Intel® 80486 processor
- 4Mb of 32-bit RAM (expandable to 8Mb on motherboard; total system RAM of 16Mb with optional 32-bit memory card)
- U.S.-made motherboard
- 200Mb Maxtor hard drive with 15ms access; 16-bit controller with 1:1 interleave; 32K disk read-look-ahead cache buffer
- 64K SRAM memory cache; read/write-back caching
- High density 1.2Mb 5.25″ and 1.44Mb 3.5″ floppy drives; also read/write low density disks
- Eight expansion slots; one 32-bit slot; six 16-bit and one 8-bit slot
- Weitek math coprocessor support
- One parallel and two serial ports
- High-resolution monochrome monitor
- Clock/calendar chip rated at 5 years
- 200 watt power supply (220 watt power supply in tower case)
- Desktop case with room for 3 exposed and 2 internal half-height devices
- Front mounted reset and high/low speed controls
- Exclusive Northgate *OmniKey* keyboard
- MS-DOS 4.01 and GW-BASIC software installed
- On-line User's Guide to the system and MS-DOS 4.01
- QA Plus Diagnostic and Utility software
- Microsoft Windows 3.0 and mouse
- 1 year warranty on system parts and labor; 5 years on keyboard
- Unlimited 24-hour toll-free technical support
- Free on-site service for one year
- FCC Class B Certified

Select the options you need... let Northgate custom build them into your system today!

- Hard drives up to 1.2 gigabytes
- Tape back up devices
- Floppy, CD ROM and optical drives
- Modems
- Laser quality and dot matrix printers
- SVGA color monitors and cards
- Weitek coprocessors

Select our Elegance 486i Power System! This package exemplifies power! You get all the same great features of our base system PLUS a host of powerful additions!

- 14″ SVGA color monitor with 1024 x 768 resolution
- 16-bit SVGA adapter with 512K video memory
- Seven bay tower case with room for three exposed and four internal half-height devices
- PLUS a $1139.00 value software package, AT NO EXTRA CHARGE! You get Microsoft Windows 3.0, Samna® Ami™ Professional word processing software and Wingz™ graphics spreadsheet and database software.

Support power! Elegance 486i ISA is backed by expert toll-free technical support 24 hours a day, seven days a week. PLUS, free on-site next day service to most locations if we can't solve your problems over the phone AND a 1 year parts and labor warranty; 5 years on *OmniKey*® keyboard.

Northgate doubles no-risk trial offer! We're so sure you'll love Elegance 486i, we'll let you use it RISK FREE for 60 days! If it fails to meet your expectations, return it for a full refund. No questions asked!

ORDER TODAY!

Complete Elegance 486i System

ONLY $5895.00

Power User's System Just $6495.00

Delivered to your home or office

EASY FINANCING: Easy payment options. Use your Northgate Big 'N', VISA, MasterCard ... or lease it. Up to five-year terms available.

CALL TOLL-FREE 24 HOURS EVERY DAY

800-548-1993

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* *PC Magazine*, September 11, 1990 ** *PC Magazine*, September 25, 1990
†*InfoWorld*, July 30, 1990 ††*Computer Currents*, August, 1990

Northgate® Elegance™ 386™/33 System...

Now! Northgate Slashes Price... Doubles No-Risk Trial To 60 Days!

PC MAGAZINE
EDITORS' CHOICE
October 31, 1989

INFO WORLD
#1
1989 TOP 100

COMPUTER SHOPPER
Best Buy

NOVELL LABS AUTHORIZED
TESTED AND APPROVED
NetWare Compatible

Award winning 386 performance! Sizzling Northgate Elegance 386/33 and 386/25 systems won *PC Magazine* Editors' Choice awards, were rated #1 and #2 products (respectively) in *InfoWorld* AND received *Computer Shopper* "Best Buy" recognitions. No other company can make that claim! Here's how we did it!

Elegance 386's high performance motherboard is designed and manufactured by Northgate. With a 16Mb 32-bit DRAM capacity, it's consistently rated in the top 1% of performance — at 25 and 33MHz, Elegance 386 is the fastest in its class!

Tri-caching started here! Elegance was Northgate's first triple caching machine. It comes with 64K read write-back SRAM cache to accelerate the execution of instructions. (Northgate exclusive 256K system available.) A 32K hard drive cache controller accelerates I/O transactions while Smartdrive DOS disk caching software increases overall system throughput.

Zip through demanding programs. Multi-stage caching easily handles even a heavy overhead of video programs, I/O intensive tasks, network servers, large data bases and advanced desktop publishing programs.

Desktop or tower. . .your choice! Elegance 386 comes standard in our elegant five bay desktop case. Our popular seven bay tower case is also available. Either way, you get plenty of room for all kinds of I/O boards, and internal/external peripherals.

Start with our base system! Northgate uses a modular approach that lets you add the components you need. Northgate's Elegance 386 base system includes 1Mb of RAM, a 40Mb fast access hard drive, 1.2Mb 5.25″ and 1.44Mb 3.5″ floppy drives, a 14″ high resolution monochrome monitor and our exclusive *OmniKey*® keyboard.

PC Magazine said: Elegance "combines top performance, good components and aggressive pricing...an excellent performer all around."*

Tell us what you need . . . we'll build your system! Performance options include: hard drives up to 1.2 gigabytes with 15ms access; VGA and SVGA color cards and monitors; Intel and Weitek math coprocessors; CD ROM and optical drives; tape backups; printers and a host of others!

Industry's finest 24-hour toll-free technical support! Your Elegance 386 is backed by expert technical support any time you need it. Call toll-free, 7 days a week, 24 hours a day. PLUS, free on-site next day service to most locations if we can't solve your problems over the phone.

Elegance 386 is backed by a one year warranty on parts and labor; five years on the *OmniKey* keyboard. If a part fails, we'll ship a replacement to you overnight at our expense — before you return your part!

Now! Use Elegance 386/25 or 33MHz RISK FREE for 60 days! If it fails to meet your expectations, return it. No questions asked.

Select our Elegance 386 Power System! We took our popular Base System and added even more power-packed features! You get:

- 4MB of RAM
- Super-fast 200Mb Maxtor hard drive with 15ms access
- 14" SVGA color monitor
- 16-bit SVGA adapter with 512K video memory
- PLUS $1139.00 suggested retail value software package at NO EXTRA CHARGE! Microsoft® Windows™ 3.0, Samna® Ami™ Professional word processing software and Wingz™ graphics spreadsheet and database software.

Elegance 386 Base System Features:

- 25 or 33MHz Intel® 80386DX processor
- 1Mb of 32-bit RAM (expandable to 8Mb on motherboard; total system RAM of 16Mb with optional 32-bit memory card)
- U.S.-made motherboard
- 40Mb fast access hard drive; 16-bit controller with 1:1 interleave; 32K disk read-look-ahead cache buffer
- 64K SRAM memory cache; read/write-back caching
- High density 1.2Mb 5.25" and 1.44Mb 3.5" floppy drives; also read/write low density disks
- Eight expansion slots; one 32-bit slot; six 16-bit and one 8-bit slot
- Weitek math coprocessor support
- One parallel and two serial ports
- Hercules compatible video adapter
- Clock/calendar chip rated at 5 years
- 200 watt power supply (220 watt power supply in tower case)
- Desktop case with room for three exposed and 2 internal half-height devices; optional seven bay tower case has room for three exposed and four internal half-height devices
- Front mounted reset and high/low speed controls
- Exclusive Northgate *OmniKey* keyboard
- 14" high resolution monochrome monitor
- MS-DOS 4.01 and GW-BASIC software installed
- On-line User's Guide to the system and MS-DOS 4.01
- QA Plus Diagnostic and Utility software
- 1 year warranty on system parts and labor; 5 years on keyboard
- FCC Class B Certified

ORDER TODAY! Call toll-free 24 hours every day.

25MHz Base System Model

$2799.00

Power User's System $4499.00

33MHz Base System Model

$3099.00

Power User's System $4799.00

Delivered to your home or office

EASY FINANCING: Easy payment options. Use your Northgate Big 'N', VISA, MasterCard . . . or lease it. Up to five-year terms available.

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*PC Magazine, October 31, 1989

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Northgate® Announces...

SlimLine™ 386/25™-

Plus! A new 60-day no-risk trial!

First time ever! Now you can have Northgate Elegance™ power, speed and performance in our popular space-saving SlimLine case! Elegance 386 computers shocked the industry with a #1 and #2 sweep of *Infoworld's* 1989 best product awards; AND three Editors' Choice awards from *PC Magazine*.

Cache! Cache! Cache! Like our powerful Elegance systems, Slimline 386 features 64K SRAM cache to zip through the execution of instructions. For even more speed, we've added a hard drive cache that makes short work of I/O transactions. To top it off, SlimLine 386 comes with Smartdrive DOS disk caching software that anticipates the information you'll need and brings it into the cache for fast access.

Better features across the board! SlimLine's motherboard is fully integrated, allowing maximum system features in the smallest possible space. There's room for up to 16Mb of 32-bit RAM, one parallel and two serial ports, a built-in floppy disk controller and IDE hard drive controller. Plus an integrated SVGA video with 512K video RAM to speed bus throughput—makes the system faster and more reliable! And there's plenty more room for add-on peripherals—with SlimLine you get five open expansion slots.

33 Cache Systems!

Two speeds! SlimLine 386 comes with your choice of 386DX 25 or 33MHz processors. For faster math-based applications—budgets, forecasts, spreadsheets and databases—both models feature 80387 coprocessor support for adding floating point unit (FPU) speed enhancements.

All purpose systems! SlimLine Cache is the perfect network workstation or stand-alone system for business and home use. It also provides excellent support for advanced desktop publishing and graphics applications.

Or select our SlimLine 386 Power System—the same great features of the base system plus:

- 200 Mb hard drive—15ms access
- 14" VGA color monitor
- Both 5.25" and 3.5" floppy drives
- Microsoft® Windows™ 3.0, Samna® Ami™ Professional word processing software, Informix® Wingz™ graphics spreadsheet and database software. A $1139.00 suggested retail value at NO EXTRA CHARGE!
- Mouse

Industry's finest 24-hour toll-free technical support! Your SlimLine 386 Cache is backed by expert technical support any time you need it. Call toll-free, 7 days a week, 24 hours a day. PLUS, free on-site next day service to most locations if we can't solve your problems over the phone.

More great support! Your new SlimLine 386 Cache also comes with a one year warranty on parts and labor; five years on the *OmniKey* keyboard. And, if a part fails, we'll ship a replacement to you overnight at our expense — before you return your part!

SlimLine 386 Base System Features:

- 25 or 33MHz Intel® 80386DX processor
- 4Mb of 32-bit DRAM (expandable to 16Mb on motherboard)
- Down-scaled, U.S.-made motherboard
- 40Mb fast access hard drive; AT bus interface; 1:1 interleave; 32K look ahead disk caching
- 64K SRAM memory cache; read/write-back caching
- High density 1.2Mb 5.25" and 1.44Mb 3.5" floppy drives; also read/write low density disks
- Five open expansion slots; three full length 16-bit and 2 half length 8-bit
- 25 or 33MHz 80387 or Weitek coprocessor support
- One parallel and two serial ports
- Built-in 16-bit SVGA with up to 1024 x 768 resolution; 512K video memory
- Clock/calendar chip rated at 5 years
- 100 watt power supply
- Small footprint SlimLine case with room for two exposed and 1 internal half-height devices
- Front mounted reset and high/low speed controls
- Exclusive Northgate *OmniKey* keyboard
- 12" VGA monochrome monitor
- MS-DOS 4.01 and GW-BASIC software installed
- On-line User's Guide to the system and MS-DOS 4.01
- QA Plus diagnostic and utility software
- Smartdrive caching software
- 1 year warranty on system parts and labor; 5 years on keyboard
- FCC Class B Certified

Now use SlimLine for 60 days—Risk Free! We're sure you'll want to keep your SlimLine Cache—so we won't rush you. Put it to the test in your office or home for a full 60 days. If it doesn't live up to everything we say, return it for a full refund—No questions asked.

Order Today!

25MHz Base System Model

$3099.00

Power system $4199.00

33MHz Base System Model

$3399.00

Power system $4499.00

Delivered to your home or office

EASY FINANCING: Easy payment options. Use your Northgate Big 'N', VISA, MasterCard... or lease it. Up to five-year terms available.

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New From Northgate®... 20 MHz Powered Up

Color monitor shown available as option.

Yes, we're a bit late to the party with SX systems. How come? We just couldn't bring ourselves to market another ho-hum SX.

So we put our research and development team on it. Boy, did they rise to the challenge! Now you can get an SX 16 or 20 MHz machine with the power to run Microsoft® Windows™ and other 32-bit software at flashing cache-enhanced speeds. And, they packaged all this power and performance into our exclusive space-saving case — a favorite of Northgate customers!

The secret to SlimLine's space-saving design? A fully integrated motherboard designed and manufactured by Northgate! This design reduces bus load — makes the system faster and more reliable!

Motherboard features include a built-in VGA adapter (with 256K video RAM), one parallel and two serial ports, fully integrated floppy disk controller and IDE hard drive controller. Motherboard integration also makes it easier to install modems and add-on cards.

SlimLine's triple cache boosts performance to zero wait state! You get a built-in 64K memory SRAM cache to accelerate the execution of instructions; PLUS, hard drive caching to accelerate I/O transactions; and disk caching software to speed data to and from the CPU!

SlimLine™ 386SX™ 16 Or With 64K Cache!

Plus! Northgate pumps up trial offer. . . now use SlimLine SX for 60-days RISK-FREE!

Unbeatable service! Your SlimLine 386SX is backed by toll-free technical support, 24 hours-a-day, 7 days-a-week. PLUS, FREE on-site service to most locations for one year if we can't solve your problems over the phone. And if you ever need a replacement part, we'll ship it overnight — at our expense — before you return your part.

***PC Magazine** says:**
". . .Northgate stops at nothing to please its customers."

Of course, you also get Northgate's full-year warranty on parts; five years on the *OmniKey* keyboard. It's no wonder *PC Magazine* reported: "If you're looking for the subjective winner for customer loyalty, Northgate takes first prize."*

Now use SlimLine for 60-days — Risk Free! It won't take you 60 days to recognize the excellent quality of SlimLine SX. But we don't want to rush you. Take your time putting SlimLine to the test. If you aren't completely satisfied after 60 days, you can return it. Northgate guarantees your satisfaction. Order Today!

SlimLine 386SX System Features:

- 16 or 20MHz Intel® 80386SX processor
- 1Mb of 32-bit DRAM (expandable to 8Mb on motherboard — 16Mb using 16-bit memory boards)
- Down-scaled, U.S.-made motherboard
- 40Mb IDE hard drive; AT bus interface; 1:1 interleave; DisCache: 32K look ahead disk caching; 19ms access
- 64K SRAM memory cache; read/write-back caching
- High density 1.2Mb 5.25" and 1.44Mb 3.5" floppy drives; also read/write low density disks
- Five open expansion slots; three full length 16-bit and two half length 8-bit
- 16 or 20MHz 80387SX and Weitek coprocessor support
- One parallel and two serial ports
- Built-in 16-bit SVGA with up to 1024 x 768 resolution; 256K video memory
- Clock/calendar chip rated at 5 years
- 100 watt power supply
- Small footprint SlimLine case with room for two exposed and one internal half-height devices
- Front mounted system reset and high/low speed controls
- Exclusive Northgate *OmniKey*® keyboard
- 12" VGA monochrome monitor
- MS-DOS 4.01 and GW-BASIC software installed
- On-line User's Guide to the system and MS-DOS 4.01
- QA Plus diagnostic and utility software
- Smartdrive disk caching software
- 1 year warranty on system parts and labor; 5 years on keyboard
- FCC Class B Certified
- Other configurations available, just ask!

16 MHz System **$1999.00**

20 MHz System **$2199.00**

Delivered to your home or office.
Call for other configurations and pricing.

EASY FINANCING: Easy payment options. Use your Northgate Big 'N', VISA, MasterCard ... or lease it. Up to five-year terms available.

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Northgate™ Gives You Credit!

Pay for your Northgate system with budget-easing monthly installments.

Owning any Northgate system is easy and affordable when you use Northgate's Big 'N' credit card. Own an award-winning computer system without straining your budget or tying up your major credit cards. When you Charge-it on Big 'N' your payments fit your budget every month.

Simply fill out the Big 'N' information form at the right and send it to Northgate Computer Systems, P.O. Box 59080, Minneapolis, MN 55459. We'll do the rest. Better yet, call our toll free number and talk to a Big 'N' representative.

After your credit is approved, one of our expert sales representatives will help you design the Northgate system that's just right for you. Best of all, your system will be shipped promptly.

Northgate also offers flexible long term leasing plans for your business. You can choose the plan that best suits your needs, with up to 5 year terms available.

Charge-it on Northgate's Big 'N' credit card! It's EASY to qualify, CONVENIENT to use with 24 hours a day, 7 days a week service, and assures FAST delivery after you order.

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NOTICE TO WISCONSIN RESIDENTS
You must disclose your marital status.
☐ married
☐ unmarried
☐ legally separated

A married person may apply for individual credit. I am applying for (please check appropriate box):
☐ **JOINT CREDIT** with another person. Complete entire application.
☐ **INDIVIDUAL CREDIT** but rely on income or assets of another person as a basis for repaying the credit requested. Complete entire application.
☐ **INDIVIDUAL CREDIT.** Complete sections "a" and "b" only.

Please complete all appropriate sections, providing at least two year's residence and employment history. This will enable your application to be processed as quickly as possible. If you are self-employed, please be sure to complete section "D" on back.

Applicants must be 18 years of age or older.

a. Your Personal Information

Requested Line of Credit $_____

Your Name: First Initial Last **Date of Birth:** Mo. Day Yr. **Social Security Number:**

Present Address Street Apt. # City State Zip **Home Phone** ( ) –

Date of Residence: Month Year Buy ☐ Rent ☐ Other ☐

Monthly Payment: $

Previous Address: **Dates of Residence:** From To

Your Employer: (If self-employed, see rear panel) **Date of Employment:** Mo. Yr. **Position:** **Monthly Income:** Gross $ Net $

Employer's Address: Street City State **Business Phone:** ( ) –

Previous Employer: **Address:** **Dates of Employment:** From To

Income from alimony, child support or separate maintenance payments need not be disclosed if you do not wish to have it considered as a basis for repaying this obligation.

Other Income:

I have received since: (Date) Monthly Income: Gross $ Net $

Name and Address of Nearest Relative Not Living With You: *Relationship:*

b. Credit Information

Include joint applicant's information, if joint account requested.

Bank Account: Bank Name Address ☐ Checking ☐ Savings

Bank Account: ☐ Checking ☐ Savings

	Payment	Balance
Bank Loan Reference:		
Bank Card Reference: ☐ **VISA** ☐ **MasterCard**		
Other Credit Card Reference		
Other Credit References: Account No: Expires:		

Driver's License No. State: Expires:

c. Joint Applicant's Personal Information

*If you are a married Wisconsin applicant, you must provide your spouse's information below, even though your spouse may not be signing this contract.

Joint Applicant's Name: First Initial Last **Date of Birth:** Mo. Day Yr. **Social Security Number:**

Address Street Apt. # City State Zip **Date of Residence:** Mo. Yr. **Home Phone** ( ) –

Employer: **Date of Employment:** Mo. Yr. **Position:** **Monthly Income:** Gross $ Net $

Employer's Address: Street City State **Business Phone:** ( ) –

d. Self-Employed Information

Complete this section only if you are self-employed.

Business Name: ☐ Proprietorship ☐ Corporation ☐ Partnership

Business Address: Business Telephone: ( ) –

Description of Business: Your Position: In Business Since:

Your annual income from business: Business' annual income: (gross) (net)

You must provide at least one of the following:

1. Business Bank: Name Telephone ( ) – Personal Banker's Name:
2. Accountant's Name Telephone ( ) –
3. **Financial statement on business attached.**

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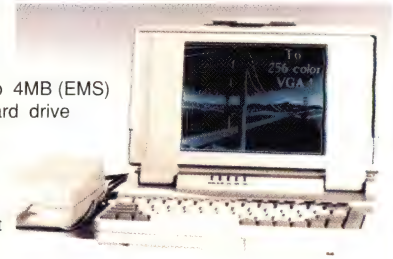

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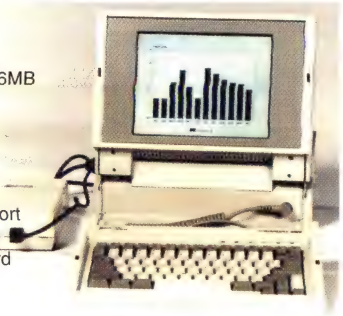

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System Price	40mb	65mb	80mb	100mb
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VGA Color	$1,599	$1,699	$1,849	$1,949
VGA 1024	$1,749	$1,849	$1,999	$2,099

Standard Features

- ✓ 16mhz Intel 80386-SX processor.
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- ✓ Clock calendar, parallel port, and two serial ports.
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System Price	65mb	80mb	100mb	200mb
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Standard Features

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- ✓ 65 mb 22ms RLL hard disk, 1:1 interleave.
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- ✓ Monochrome monitor with monochrome graphic board.
- ✓ 200 watt power supply.
- ✓ Clock calendar, parallel port, and two serial ports.
- ✓ Keytronics 101 key enhanced keyboard.
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Standard Features

- ✓ 12mhz 80286 processor.
- ✓ 1 megabyte of zero wait-state RAM.
- ✓ 40 mb 28ms hard disk 1:1 interleave.
- ✓ 1.2mb 5.25" or 1.44mb 3.5" floppy drive (2nd drive add $79).
- ✓ Standard chassis with keylock, and speed and reset buttons. (Optional chassis add $50)
- ✓ 8 expansion slots and 5 drive bays.
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- ✓ Clock calendar, parallel port, and two serial ports.
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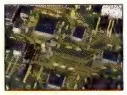

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FastData systems use some of the best parts in the industry. For example, each FastData system ships with a Keytronics keyboard; Keytronics costs a lot more than others, but the quality is worth it. Standard equipment includes quality components from Toshiba,Western Digital, Phoenix and other industry leaders.

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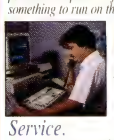
Our face to face retail background has made us never forget that the customer comes first and that a personal computer is just part of a customer's overall needs. That's why FastMicro offers thousands of hardware and software products to enhance your new personal computer. In fact, our competition will probably tell you to call us when you need something to run on their personal computer.



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64MB AT RLL Kit w/ controller 349
Seagate
20MB XT Kit #225 239
30MB XT Kit #238 249
40MB AT #251-1 299
80MB SCSI #296N 389
Toshiba
360K Floppy 69
720K 3.5" Floppy 69
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1.44MB 3.5" Floppy 79

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Clarion Prof. Developer 449
Clipper 5.0 459
DataEase 459
dBase III+ 439
dBase IV 479
dBXL Diamond 129
Foxbase Plus 177
FoxPro 417
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GEM Desktop Pub. 159
Generic Cadd Level 2 Starter Kit 109
Generic Cadd Level 3 199
Harvard Graphics 275
Pagemaker 479
PC Paintbrush IV Plus 109
Perspective Jr. 69
PFS:First Publisher 89
Publisher's Paintbrush 149
Publish It! 104
Ventura Publisher Gold 519

FINANCIAL

Bedford Integrated Acct. 145
DAC Accounting 4.0 79
DAC Bonus Pack 4.0 157
Dollars & Sense ..... Call
Managing Your Money 113
Peachtree Complete III 139
Peachtree with Data Query 209
Quicken 35

INTEGRATED

First Choice 105
SmartWare II 417
LotusWorks 89
Windows 3.0 89
Works 89

MICE

Keytronics Professional 65
Logitech HiRes C9 Serial 65
Logitech HiRes C9 Bus 76
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Microsoft with Windows 3.0 147

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Quick Basic 60
Quick C 60
Quick Pascal 60

SPREADSHEETS

Allways 106
Excel 309
Lotus 1-2-3 version 2.2 325
Lotus 1-2-3 version 3.0 ..... Call
Lucid 3-D 53
Quattro Pro (call for details) 89

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Ami (WP) 115
Ami Professional (WP) 287
Asymetrix Toolbook 279
Corel Draw (GR) 309
DBfast/Windows (DB) 189
Excel (SS) 309
Grammatik IV for Windows (WP) 49
PC Paintbrush for Windows (GR) 77
Pagemaker (DP) 479
Micrographix ..... Call
Microsoft Mouse w/ Windows 3.0 147
Ventura Publisher Gold (DP) 519
Windows 3.0 89
WingZ for the PC (SS) 309
Word for Windows (WP) 309

WORD PROCESSORS

Grammatik IV 49
Multimate 4.0 267
Professional Write 149
Rightwriter 4.0 ..... Call
Sprint 117
Word 209
Word for Windows 309
Word Perfect 5.1 239
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Word Perfect Office 79
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CoreFast 60
Carbon Copy Plus 109
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Desqview 386 115
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Fastback Plus 109
Formtool Gold 52
Formfiller 85
Headroom 59
Laplink III 85
MS-Dos 3.3 or 4.01 59
Mace Utilities 1990 85
Norton Advanced 5.0 109
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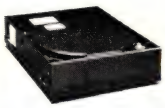

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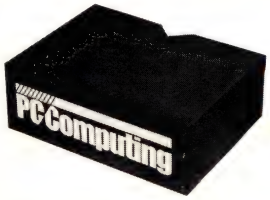

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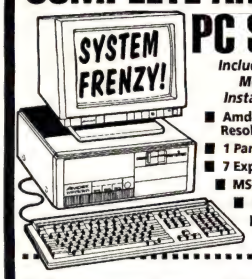

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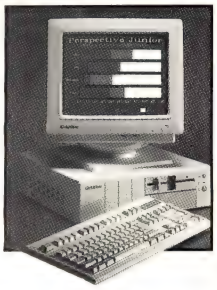

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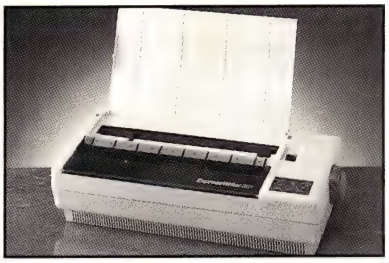

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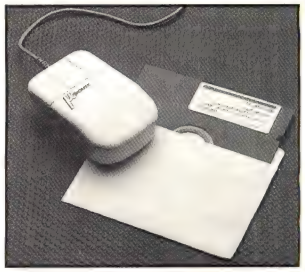

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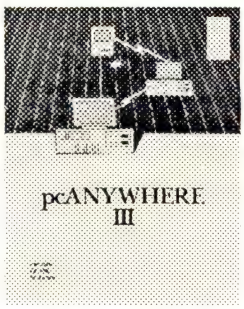

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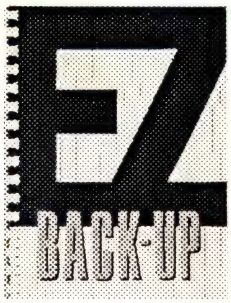

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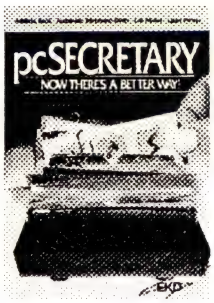

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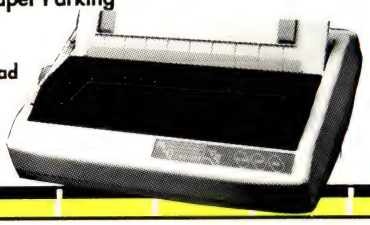

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HARDWARE 253-257

ADD-IN BOARDS 253
BAR CODING 254
CD-ROM 255
COMPUTER INSURANCE 255
COMMUNICATIONS 255
COMPUTER SYSTEMS 255
CONNECTIVITY 256
PERIPHERALS 256
PRINTERS 257
POWER SUPPLIES 257
UPGRADES 257

SOFTWARE 258-262

BUSINESS 258
BUSINESS TIME MGMT. 258
CONSTRUCTION 258
DATA BASE 258
EDUCATION 258
ENTERTAINMENT/GAMES 259
FINANCIAL 259
GENERAL 259
GRAPHICS 259
HEALTH 259
MAILING PROGRAMS 259
MUSIC/MIDI 260
PUBLIC DOMAIN 260
RELIGION 261
SPORTS 261
UTILITIES 261
WINDOWS 262

MISCELLANEOUS 262-263

ACCESSORIES/SUPPLIES 262
PUBLICATION/VIDEOS 263
TONER CARTRIDGE REFILLS 263

(ADDITIONAL CATEGORIES AVAILABLE)

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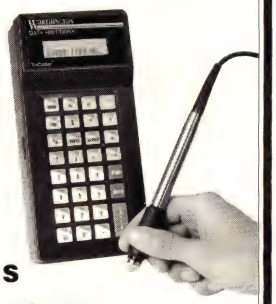

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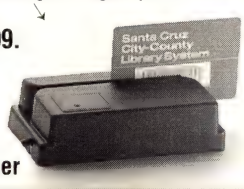

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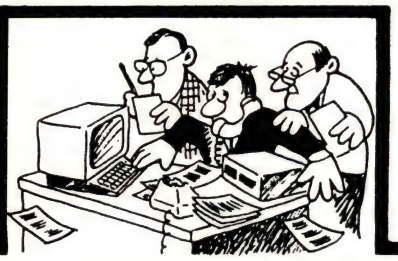

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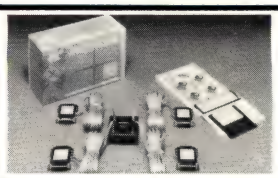

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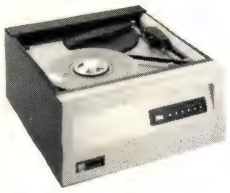

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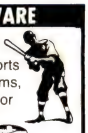

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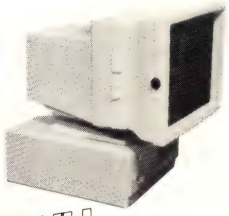

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Selling Your PC? Get More Bucks for the Box

First grab a pencil and add up your system's assets.
By Wendy Taylor

The minute you pull your new PC from its packing materials, it loses between 15 and 40 percent of its value. The price you'll actually receive when you sell your system, however, depends on its model and make, its configuration, how you plan to peddle it and a host of other factors. When it's time to put your PC on the block, a few guidelines can help you determine what it's worth and how to get the most for it.

Name recognition carries weight in the used-PC market in three ways. Premium brand PCs, such as IBM, Compaq and Apple, retain more of their original value than other PCs and are the easiest to resell. Widely recognized names, such as Hewlett-Packard, NEC and Epson, also maintain their value but don't resell as quickly as premium brands. Finally, lesser-known names, such as Northgate, Dell and GoldStar, depreciate more quickly and are more subject to market fashions.

What you'll actually receive for your used PC varies by hundreds of dollars from week to week. But generally, a bare-bones IBM or Compaq 8088 system with 640K of RAM, a 10MB hard drive and an EGA monitor fetches about $500; a Dell or NEC with the same configuration sells for $475; and a GoldStar brings about $400.

Not surprisingly, better technology

Street Prices

386SX PORTABLE PCs

Prices are based on 40MB hard drive, 2MB RAM and VGA graphics. *60MB hard drive

	LOW	HIGH
ALR POWERFLEX 20 CSX	$1,812	$2,167
ARCHE RIVAL 386SX	$1,817	$2,141
AST PREMIUM 386SX/16	$1,742	$2,383
AT&T 6386/SX	$2,582	$3,123
COMPAQ DESKPRO 386S	$2,001	$2,501
EPSON EQUITY 386SX	$1,861	$2,350
HEWLETT-PACKARD VECTRA QS/16S	$1,985	$2,552
*IBM PS/2 55SX	$2,508	$3,265
NEC POWERMATE SX PLUS	$1,813	$2,442
NCR PC386SX	$2,319	$3,376
OLIVETTI PCS386SX	$1,748	$2,315

These prices reflect the general range for retail sales throughout the continental United States and were compiled by PC/Computing's network of correspondents. Prices in your area may vary from these.

commands a higher price. A 10-to-12MHz Compaq or IBM 286 with 1MB of RAM, a 20MB hard drive and VGA graphics sells for about $1,100. An NEC with the same configuration goes for $950, while a GoldStar brings $850. A 16MHz 386 Compaq with 1MB of RAM, a 40MB hard drive and VGA sells for $1,800. The price drops to $1,500 for an NEC and to $1,150 for a GoldStar.

Figuring Your Configuration

These examples should give you at least a ballpark figure for your basic configuration. Now you'll want to add to it the value of any extra memory, floppy drives and add-on boards that you've installed. An additional 20MB of hard disk storage adds about $175; 40MB above standard configuration adds roughly $225 to $290. A system with both 5¼-inch and 3½-inch drives sells for roughly $50 more than a PC with only one diskette drive. It also sells faster.

Expect fax cards, internal modems, video cards and other add-on components to shed a staggering 70 to 90 percent of their value immediately. A Hayes 1,200-bps internal modem that sells for $139 new is worth only $50 the minute you drop it into your PC. A $369 Hayes 2,400-bps external modem brings only $100 used. Lesser-known brands fare worse—a 1,200-bps internal modem that sells for $100 new is worth only $20 once you call it yours. And a 300-bps modem is virtually unsellable.

Highly specialized equipment, such as sound cards, digital analog converters and costly video cards, doesn't add any value to your PC unless you can find a buyer who specifically wants these options. Sell these items separately; you'll get a better price.

Making It Market-Ready

When you're ready to sell, you may have to invest a little money to bring your system up to market expectations. If any of your equipment isn't working, you'll need to invest in repairs—damaged equipment simply doesn't sell. Spending $50 to $100 on RAM to bring your 8088 up to 640K, for example, can mean the difference between finding a buyer and no sale. A 286 PC should have at least 1MB of RAM. A 386 should have at least 1MB, ideally 2MB or more. For each megabyte above these basic configurations, add $100.

At the same time, be aware of diminishing returns. Six megabytes of RAM won't enhance the value of an 8088, and 16MB of RAM is more than most people need for their 386. Remove this extra memory before you sell; you can install it on your next PC. Likewise, you won't recoup the cost of upgrading your system's graphics or hard disk. These aren't worth the investment if it's just to make your PC more attractive on the used market.

Where you sell your PC also affects your asking price. Selling by word of mouth or through user groups or BBSs reaps the best returns. The trade-off is the time you'll spend showing the PC and negotiating the sale.

If you can't hawk your PC locally, try a national broker such as the National Computer Exchange (800-359-2468), in New York City, or the Boston Computer Exchange (617-542-4414). These growing organizations match buyers and sellers of used equipment across the country. But be aware that brokers typically charge a 10 percent commission and require you to pick up the shipping costs to the new owner, thus creating overhead charges that cut into your profit.

If all else fails, consider trading in your system or selling through a used-computer store. Trade-ins mean quick cash applied toward a new purchase, but don't expect much—as little as 50 percent of the actual fair market value. An IBM AT may bring you $1,000 or more on the open market, but only $500 to $700 as a trade-in. Used-computer stores take a bite out as well—typically a 30 percent commission and no guarantee of a sale.

However you sell, remember that time is on your side. The National Association of Computer Dealers reports that the used-PC market is growing and that demand exceeds supply by a ratio of 3 to 1. With those odds, there's no reason you should settle for less than the full market value of your system.

PC/C Advocate

BACK-ORDER VINDICATION

In April I ordered an NEC CDR-80 ROM drive and the accompanying XT-AT interface kit from the mail-order company PC Brand in Chicago. The CD-ROM drive arrived promptly, but the interface had to be back-ordered. There was no indication on the invoice or anywhere else when my board would be shipped. Periodically I inquired about the status of my back order, but no one would commit to a ship date. Finally my sales representative told me that NEC no longer made the interface. He advised me to hunt one down at NEC or return the CD-ROM drive for a refund. Meanwhile, they've had my money for three months!

Bodo Diehn
Scottsdale, Arizona

Apparently PC Brand thinks its oversight was inexcusable. When we confronted the company, customer service manager Bob Huegel agreed to ship you the newer NEC CDR-82 ROM drive and interface card via overnight mail. You won't be charged anything extra for the newer model—or for shipping.

PC Brand admits that you weren't "taken care of well" and that you should never have received an incomplete order. Nor should you have been kept in the dark about your order. The company is "taking steps" to correct the problem.

Huegel suggests that whenever you're dissatisfied with your sales representative at PC Brand, ask to speak with a manager. It's good advice no matter where you shop.

FULL REFUND MINUS $97.41

In March I ordered a computer and printer from MicroLab in Farmington Hills, Michigan. The sales representative guaranteed that I'd receive a full refund if I returned the order, that MicroLab wouldn't charge my credit card until the order was shipped and that I would receive the order no later than April 6. I followed up the phone order with a letter that restated these terms.

PC/C Advocate

On April 9, I called to check on my order and was told it would be shipped on April 12. Frustrated, I canceled. To make matters worse, even though MicroLab assured me my credit card would not be charged until shipment, it was charged on March 26. When the company finally issued a credit memo, it was for $97.41 less than the cost of the order—with no reason given for the credit. After repeated phone calls and letters, neither I nor my credit card company can resolve this issue.

Michael Hartzheim
Warner Robins, Georgia

It took repeated phone calls to MicroLab, but finally the customer service manager agreed to credit your charge card the $97.41. Despite your follow-up letter, MicroLab claims it had no record of cancellation, and so it shipped the merchandise. When you refused the packages, *then* MicroLab considered the order canceled and issued the credit—minus the $97.41 shipping charges.

Though a follow-up letter should be more than adequate, sending a registered letter to cancel an order (after canceling over the phone) is a good backup in case the company tries to claim otherwise. One other precaution: On phone orders, get the name of your customer service representative. Address your correspondence to this person directly.

HOLDING PRINTER HOSTAGE

A friend of mine ordered a printer, a math coprocessor and two Teac floppy drives in April for me from California Microchip, a mail-order firm in Chatsworth, California. The order was charged to my credit card under my friend's name. The order arrived on time, and everything worked except the printer—the wrong pins were striking.

I contacted the company and returned the printer for replacement. After a few weeks, I called to find out when I could expect the new printer, but couldn't reach the customer service desk. Since then, I've sent letters by registered mail and have yet to

Head for the Chicago 'Burbs for Professional PS/1 Service

Now that IBM wants to sell PCs to the home market again with its ballyhooed PS/1, I decided to see what a customer could expect in the way of advice and service on the retail floor. And what better place to shop for PS/1s than two Sears stores in the Chicago area, home of the flagship chain that sells Big Blue's new computer?

My first stop was the northwest side of Chicago and the venerable Sears Roebuck store built in 1938. There I found a PS/1 lodged between a popcorn stand and the television sets. Three more could be found around the corner.

After a 15-minute wait in full view of idle sales help, someone finally came to my aid. "Can I help you?" asked a salesman in a harried, fatigued tone.

"I use Lotus 1-2-3 at work and need to take some work home. Can you give me some advice about which PC would suit my needs?"

"With Microsoft Works and other programs built-in, the PS/1 can do spreadsheeting and the other things you want," he answered, adding a new word—*spreadsheeting*—to my already jargon-laden vocabulary. Unfortunately, he failed to mention that it can't read 5½-inch disks because it has no drive to accommodate them—at least not in the base model.

After a canned recital of the $1,995 PS/1's hardware, my salesman flew headlong into a demonstration of Works. Ignoring my emphasis on spreadsheets, he began piping a spiel about the word processor, but soon hit the shoals in Works' "easy-to-use" menus (easy, perhaps, for non-salesmen).

Finally, after minutes of watching his frantic poking and mouse pointing, I asked again about the spreadsheet. After floundering through the filer and the Help system, he finally stumbled onto the spreadsheet and proclaimed that it would help me estimate my gas mileage (that ought to cinch a sale, I thought).

"But how do I learn about the computer after I get it?" I asked.

"Well, the machine can teach you," he said, confusing the Works tutorial for a general tutorial. "But I'm not a technician or programmer. I can't teach you about computers," he added, belaboring the obvious.

In search of better advice, I drove out to the Woodfield Mall Sears store in suburban Schaumburg one bright Saturday morning. There I found a rarity—inspired sales help.

Resting at a PS/1 sign for two minutes conjured the familiar "Can I help you?" from an approaching salesman.

"I know nothing about computers, but my three children are starting to use them at school. I also want to do some record keeping and budgeting."

"I think the PS/1 is ideal for what you want," he replied.

With little jargon, my salesman then explained each piece of equipment and its benefit with clarity and confidence. His only blooper concerned the VGA. "The dots on the screen are called pixels. On the VGA, you won't see any pixels."

He explained reassuringly how the software bundled with the machine could help. Works could do the record-keeping and budgeting. The tutorials and the PS/1 User's Group on Prodigy could assist in computer literacy. Work's word processor and Prodigy's online references could help the children with school work. And so on.

When asked about the IBM and Apple compatibles lining the adjacent shelves the salesman replied, "They aren't designed for novices. Most people return those machines. They don't return the PS/1."

I was heartily impressed. At least his sales pitch confirmed what I already knew about the IBM PS/1. But if this experience and the one in northwest Chicago are any guide, IBM may have entrusted its latest home computer to sharply uneven sales support across the country.

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Jerry Cover
Program Information Coordinator
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PC Champion
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Jerry Cover's expertise with PCs plays a vital role in the Governor's office. His staff uses PCs to track Federal grants, monitor legislation and handle audits and constituent mail.

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PC Computing
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PC/C Advocate

receive a response. I think the problem may be that the name on the credit card is not the same as the one on the order, but I can't get through to the company to find out.

Terry Smithwick
New Orleans

After we explained your predicament to sales manager Tom Gregory, California Microchip agreed to refund your money or send you the printer right away.

Protect yourself when buying by mail-order by placing the order yourself, using your own credit card and having the order shipped to the address on the card. This could be critical to a speedy refund should you have to stop payment on an order.

TIP OF THE MONTH

Radio Frequency (RF) emissions from radio and television transmissions can interfere with your PC and other home appliances. To make sure that your PC is properly RF shielded, look for an FCC Class B certification label on the bottom or back of your machine.

The FCC requires that all PCs sold in the United States receive either Class A or Class B certification. Class A approves PCs for commercial or industrial use; Class B ensures that they're safe to use at home. Class B guarantees that your PC is protected from interference from incoming RF, and that your PC's emissions won't interfere with your other home appliances.

The Class B rating becomes particularly important with faster microprocessors because these emit higher frequency signals that are more difficult to contain and more likely to interfere with other appliances. To confirm your equipment's classification, call your local FCC office or dial into the FCC's electronic BBS at (301) 725-1072.

Do you need help resolving a computer issue? Drop a note to the PC/C Advocate, PC/Computing, *Four Cambridge Center, Cambridge, Mass. 02142. Be sure to include a daytime phone number and any correspondence relating to your problem. Letters become the property of* PC/Computing *and will be edited for length and clarity.*

What to Ask

WHEN BUYING A HARD DISK CARD

1. How many slots does it require? Some makers build their hard disk cards merely by stapling a 3½-inch hard disk to a controller card. These portly units take up two slots, thereby squandering valuable expansion space. Look for highly integrated units (that is, slim design) that fit in a single expansion slot.

2. Is it compatible with your software? Most disk cards are compatible with most DOS programs. Some, however, can't run OS/2, Windows, Unix or any other protected-mode application or environment. Find out before you buy.

3. How does it perform? A hard disk card should perform as well as any typical medium-capacity disk drive system. Look for average seek times below 30ms and data-transfer rates of 450 kilobits per second or higher.

4. Would a hard disk subsystem better suit your needs? Hard disk cards are easy to install but don't offer the speed of a large hard disk subsystem. And on a per-megabyte basis, they often cost more than larger (60MB or more) hard disks. If you're buying more than 40MB of storage space, compare the price—and warranty—of the hard disk card with those of regular hard drives.

5. Can you add additional hard disk cards? If you don't know how much capacity you'll need in the future, at least ensure that you can add an additional hard disk card.

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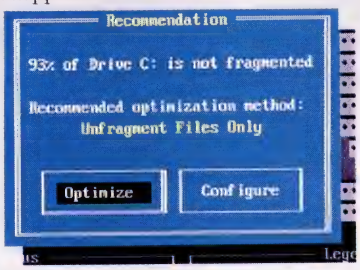
If the problem happens to be a corrupted hard disk, you'll see right away why the *Norton Disk Doctor II* is the most sophisticated utility of its kind in the world.



Now everyone from novices to experts can safely perform in-depth preventative maintenance and file recovery with a few simple mouse clicks.

Disk Doctor II finds and fixes problems other programs can't even detect. Yet it's simple enough for beginners to use.

The same goes for *File Fix*,™ an invaluable new tool that delves into the complex internal structure of your Lotus® 1-2-3®, dBase® and compatible spreadsheets and databases to make repairs that would stymie even a skilled technician.

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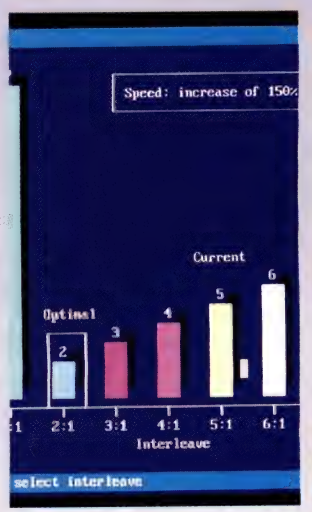
Of course, when it comes to improving performance, there's nothing quite like *Speed Disk*.™



Our new Calibrate utility revitalizes demagnetized disk areas and uses a low-level formatter to adjust your disk when the heads go out of alignment.

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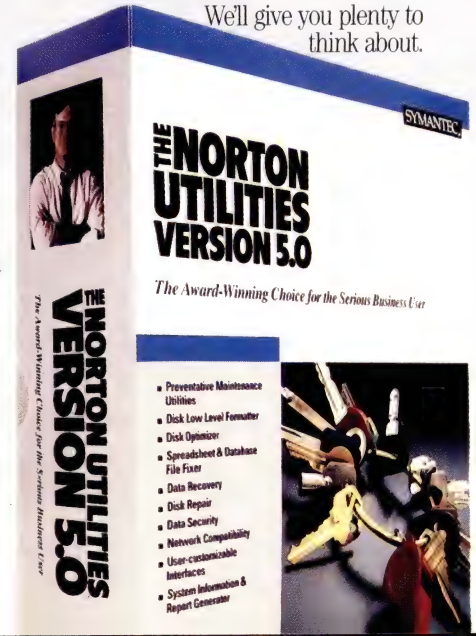

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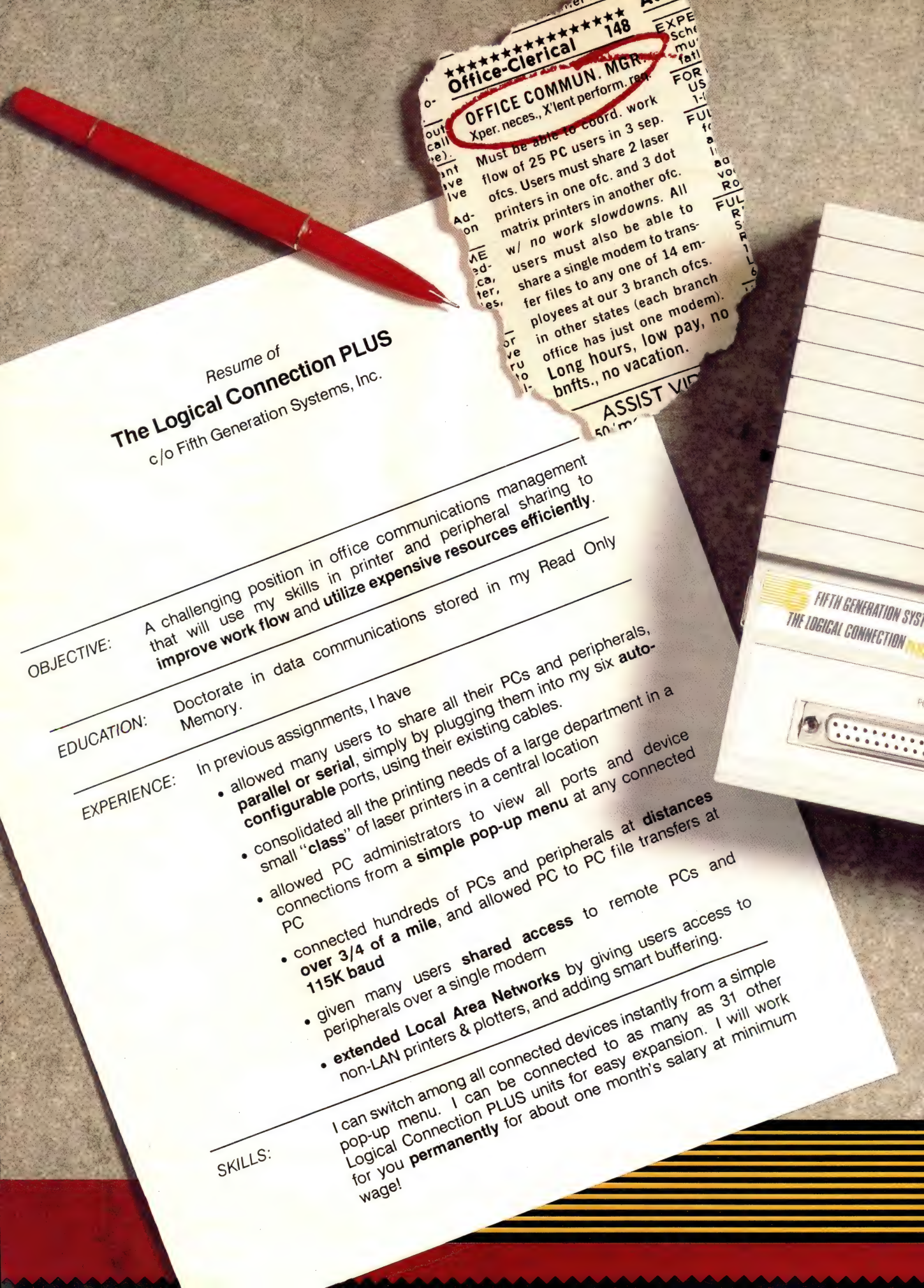
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Home Office

Powerhouse Fax Boards For Less Than $500

Intel's SatisFaxtion, Fremont's Fax96 sweep the competition.
By Preston Gralla

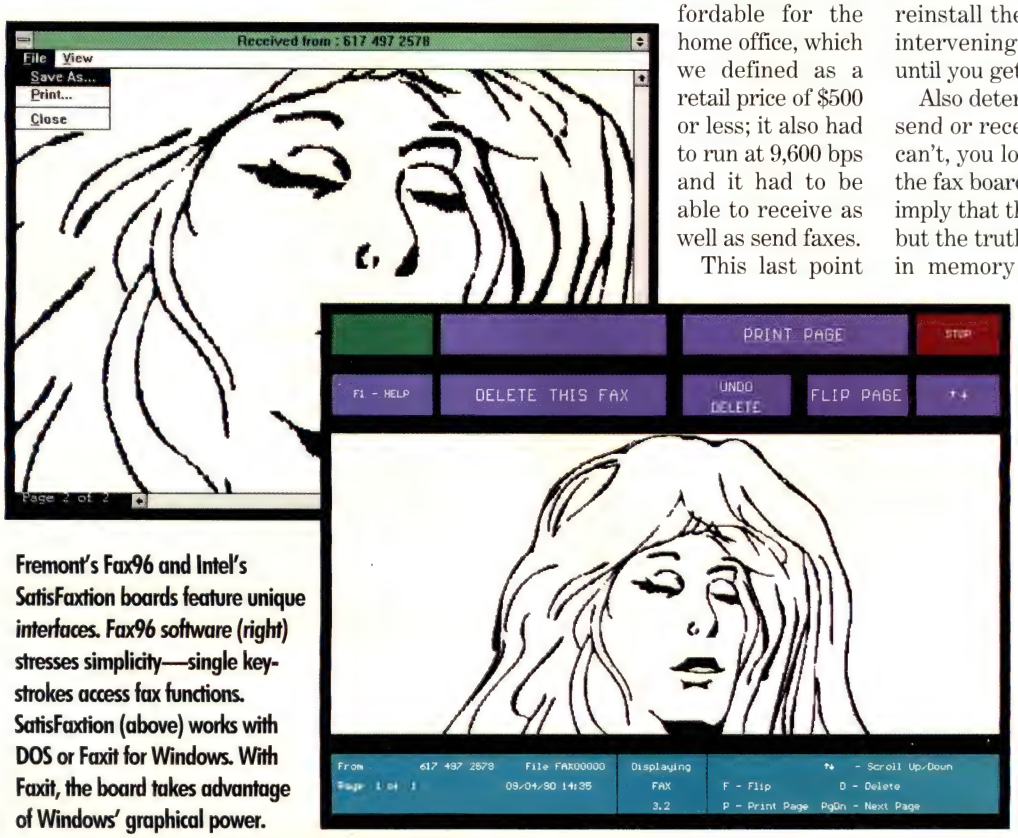
At $1,000 or more for full-featured models, fax machines have long been too expensive for the home office. But today you can fax capably with a PC fax board that costs as little as $200, or you can select a top-of-the-line, combination fax board and modem for less than $500 retail. At these prices, the question is no longer *whether* to buy a fax board for your home office, but *which* board you should buy.

Recently we put 12 fax boards suited for the home office through their paces and picked the two best—one includes a modem and one doesn't. To qualify for review, a board had to be deemed affordable for the home office, which we defined as a retail price of $500 or less; it also had to run at 9,600 bps and it had to be able to receive as well as send faxes.

This last point is particularly important, since many lower-cost boards will only let you send faxes (called broadcast faxes). Avoid these; for about the same amount of money you can buy a board that receives as well.

You should keep several things in mind when buying a board for the home office, beginning with installation and technical support. How difficult is the board to install? Most fax boards aren't easy to set up—usually you'll have to set dip switches or jumpers. And since those switches and jumpers are generally accessible only when the board is out of the machine, you may have to install and reinstall the board several times (with intervening calls to technical support) until you get it right.

Also determine whether the board can send or receive in the background. If it can't, you lose the use of your PC while the fax board does its work. Most boards imply that they work in the background, but the truth is that they don't. Lurking in memory as TSRs, they're always available to send or receive, but once you invoke them, they take control of your PC until their job is done. Since faxing or receiving—and printing the results—can take several minutes, you stand to lose a good deal of work time. Even boards that genuinely send and receive faxes in the background generally slow down your foreground application while they churn away. The one exception to this rule is Intel's SatisFaxtion board, which uses a coprocessor to offload faxing tasks.



Fremont's Fax96 and Intel's SatisFaxtion boards feature unique interfaces. Fax96 software (right) stresses simplicity—single keystrokes access fax functions. SatisFaxtion (above) works with DOS or Faxit for Windows. With Faxit, the board takes advantage of Windows' graphical power.

All the boards we reviewed handled the basics of faxing in a fairly similar manner: Each lets you schedule faxes to be sent, set up phone books of frequently called numbers and broadcast the same fax to a large list of people. Most will let you send graphics files as faxes, primarily those in PCX and TIFF file formats; several support other file formats as well. All the boards create logs of faxes that you've sent or received. Some include graphics editors as well, though standalone graphics programs are typically far better suited to editing graphics.

Intel SatisFaxtion

The best board for the home office is clearly Intel's recently released $499 SatisFaxtion. It's the closest you'll get to state-of-the-art faxing at any price. It's also the only board that truly runs in the background; it features a 16MHz 80186 on-board chip to handle fax processing, leaving your PC's CPU free to run foreground applications. The board includes a 2,400-bps MNP 5 modem as well; when you communicate with other MNP 5 online services or modems, you get an effective throughput of up to 4,800 bps. The only other board to include an MNP 5 modem was Everex's.

SatisFaxtion also conforms to the DCA/Intel Communicating Applications Specification (CAS), which other board makers are beginning to adopt. This allows application software makers to design drivers that let you toggle directly into a communications module from your application and fax or e-mail formatted files. The standard also lets you transfer files at 9,600 bps directly between CAS boards. Instead of faxing an image of a spreadsheet to another board, for example, CAS lets you send the actual 1-2-3 file itself. This is especially important for home office users, because if you have a CAS board both at home and in the office, you can transfer files between the two at 9,600 bps—four times as fast as with a 2,400-bps modem.

The board also features a built-in scanner port, so you don't need to allot a separate slot for a scanner board. But there's one drawback: The port works only with the $399 scanner that Intel is releasing with SatisFaxtion, or with Logitech's ScanMan 256. If you already use another scanner, you won't save a slot.

SatisFaxtion couldn't be easier to install. There are no switches to set—you change the interrupts through software. Once you've placed the board in your PC, it never needs to be taken out. SatisFaxtion also detects other devices you install and automatically configures itself around that setup.

SatisFaxtion's software is as innovative as its hardware. It includes versions for either DOS or Windows 3.0. The DOS software lets you fax directly from within virtually any program. When you issue the Print command in your application program, the fax software pops up and routes that file to the fax board, which then sends the file as a fax, complete with printing attributes such as boldface, underlining and type size. You can also bypass the TSR and send files from the program's menus. Windows users will appreciate Alien Computing's Faxit for Windows, which Intel bundles with the board. Faxit takes advantage of Windows' graphical power, allowing you to dress your faxes with all the fonts available in Windows. You can also cut and paste from different documents to create a new document for faxing.

While SatisFaxtion is clearly the board to buy, it's not perfect. It choked when sending two PCX files, which almost all the other fax boards managed to send. Neither does it keep a copy of the faxes you've sent, which several of its competitors do. And it doesn't include a graphics editor, which may not be a necessity but can be useful.

Fremont Fax96

If you already have a modem and don't want to spend the $499 list price for Intel's board, check out Fremont Communications' $195 Fax96 board. It does everything the more expensive boards do at a fraction of the cost. Installation and setup are extraordinarily easy, and the fax software is a model of simplicity. It generates automatic cover sheets, logs sent and received files, maintains phone books, automatically redials busy phone numbers and broadcasts a single fax to

Inside Prime Time

HOME OFFICE

272 Best Bets in Fax Boards for Less Than $500
We put 12 to the test and found two runaway winners

276 Faxing Graphics
Take a few tips from a pro

276 Reviews
You can buy a lot of fax board for less than $500

INFORMATION LINE

280 Send E-Mail Across Any Carrier with DASnet
It translates between more than 60 e-mail systems

280 Top Downloads
BIX picks to help keep you organized

GAMES AND LEISURE

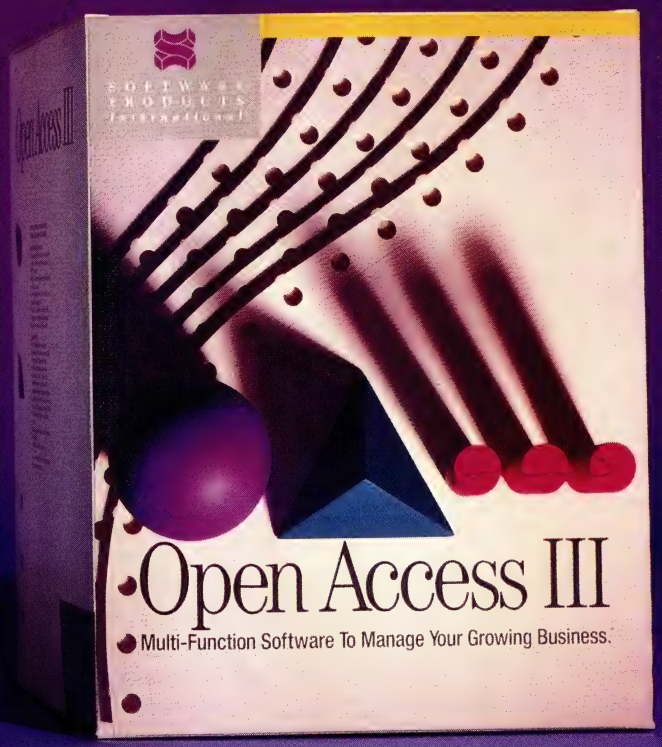
284 Holiday Cheer
Ring in the season with our Christmas game guide

PERSONAL FINANCE

304 Does Refinancing Make Sense?
This worksheet lets you look before you leap

305 Review
Managing Your Money gets a face-lift

TAKING CARE OF BUSINESS



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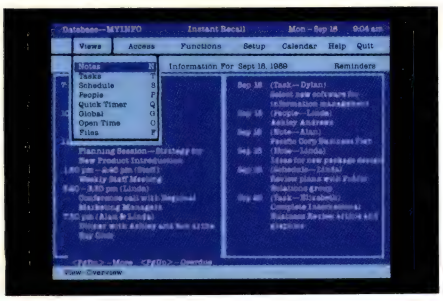

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INFO WORLD BEST IN ITS CLASS Feb. 19, 1990

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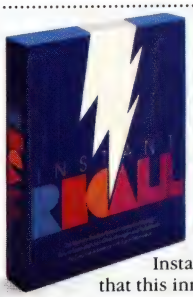
Version 1.2 Specifications
IBM PC, XT, AT, PS/2, or compatible, 512K RAM (28K in resident mode), DOS 2.1 or higher (hard disk and DOS 3.0 or higher for resident mode)



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multiple fax machines. The bargain-basement price is right, and the simplicity of the software interface makes you wonder why all board makers haven't adopted something like it.

Even better suited for the home office is Fremont's $295 1-Liner board, which solves the all-too-common problem of phone line gridlock. It allows the board to share a single phone line with a modem, telephone and answering machine by detecting whether an incoming call is a fax or regular phone call and automatically routing it to the proper device. The board's FarFetchFax software lets you dial your home office from your corporate office to retrieve faxes sent to the remote machine.

Both boards have their limitations, however. They don't send and receive in the background, they require a fair amount of memory (65K) to operate as a TSR and they don't include Windows versions.

If you can't afford to buy Intel's SatisFaxtion, then by all means buy the Fax96. But if you can scrape together the cash, SatisFaxtion is worth every penny.

SATISFAXTION

List Price: $499 ($549 for Micro Channel machines); $299 for those who trade in Intel's Connection CoProcessor.

Intel Personal Computer Enhancement Operation, 5200 NE Elam Young Parkway, Hillsboro, Ore. 97124; (800) 538-3373, (800) 525-3019 for FaxBack service.

FAX96

List Price: $195; 1-Liner, $295.

Fremont Communications Co., 46309 Warm Springs Blvd., Fremont, Calif. 94539; (415) 438-5000.

Runners-Up Prove Faxing Doesn't Have to Cost a Lot

CALCULUS EZ-FAX96

LIST PRICE: $299 (no modem). **CALCULUS INC.**, 522 Mercury Drive, Sunnyvale, Calif. 94086; (408) 733-7800.

Best suited for faxing strictly ASCII files, the Calculus EZ-Fax96 is easy to use, both in DOS command mode and through the software's menus. For graphics, however, you must run the file through a conversion utility that resides outside the main application. And in some cases, you'll need to set parameters for conversions to fine-tune your image. It operates in background mode, but doesn't include a preview feature. For $299, the EZ-Fax96 should have automatic file conversion for graphics and more features. **WENDY TAYLOR**

EVERFAX 24/96

LIST PRICE: $399. **EVEREX SYSTEMS INC.**, 48431 Milmont Drive, Fremont, Calif. 94538; (800) 821-0806.

If any fax board deserves an honorable mention, this one does. With a 2,400-bps MNP 5 modem, easy setup and installation routines and well-designed software, it would be hard to go wrong buying this unit. The board's dip switches are accessible from the rear—you can reset them without removing the board, which makes installation a snap. The fax software is simple and flexible and allows you to merge text with graphics in a single document, so that faxes can be sent bearing your letterhead. The software sends PCX, IMG and TIFF graphics files and can be run either as a TSR or as a resident program. But the board can't send or receive in the background, its software isn't written to run under Windows and it doesn't have a scanner port. **PRESTON GRALLA**

FAXMAIL 96

LIST PRICE: $499 (no modem). **BROOKTROUT TECHNOLOGY INC.**, 144 Gould St., Needham, Mass. 02192; (617) 449-4100.

The Brooktrout FaxMail 96, with its built-in text editor, excellent scanner support and handy manipulation of graphics files, seems designed for communications that are light on text but laden with graphics. It allows you to combine text and graphics and to store letterhead and signature files. Oddly, though, the program doesn't support VGA. FaxMail 96 features a background mode but takes over your PC as faxes are sent or received. The software lets you dump incoming faxes directly to your printer to avoid locking up your system. It's a utilitarian board but, at $499, there are better buys. **CAROL ELLISON**

FAXPRO

LIST PRICE: $399. **THE FAX GROUP**, 12625 High Bluff Drive, Suite 3, San Diego, Calif. 92130; (619) 792-6400.

Any file you can print on a Hewlett-Packard laser printer you can fax with FaxPro. In memory-resident mode, FaxPro's software intercepts your file

Tips for Faxing Graphics

Sending a text-only fax with a fax board is easy. A fax that contains graphics, however, can pose problems. The reason: Not all fax boards can send all kinds of graphics files. Therefore, some preventive medicine is in order.

The simplest remedy is a graphics utility called HiJaak PS. The $249 package, from Inset Systems of Brookfield, Connecticut, (800) 828-8088, converts almost any graphics files to almost any other graphics format (including PostScript); it also directly converts graphics files to the formats used by many fax boards makers. If you have a file in the GIF (CompuServe) format, for example, and your board sends files only in the TIFF format, HiJaak converts the document so you can send it. It can also capture screens from most applications and convert them into whatever format you need for faxing.

Even if your file has the proper format, however, you may not be able to fax it. This holds true particularly for files in the ubiquitous PCX format. PCX files can be saved in either color or black-and-white format. If your file was saved in color, be sure to reload it to your graphics software and save it as black and white before attempting to fax it. Fax software often chokes on color files and refuses to transmit them. **PG**

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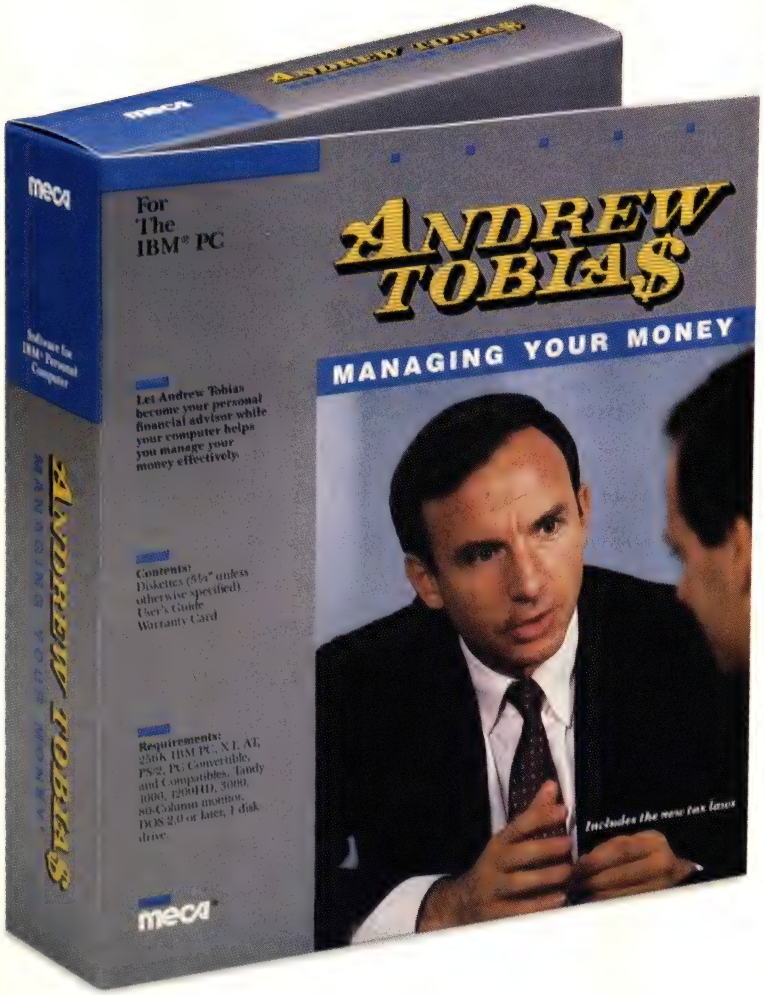

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whenever you hit the Print command in your application. A prompt asks you to send the file either to your printer or to your fax. No manual file conversions are necessary. Like Intel's SatisFaxtion, FaxPro acts as a virtual printer, converting the intercepted file from printer format to fax format automatically. The $399 program also runs as a standalone application and offers a preview feature. A Windows 3.0-compatible version of the software and a 2,400-bps modem are included, but no communications software. Nevertheless, the convenience of faxing through the print command without file conversions, along with software support for both Windows and DOS, make this a strong choice. **WT**

GAMMAFAX NA

LIST PRICE: $495 (no modem). **GAMMALINK**, 133 Caspian Court, Sunnyvale, Calif. 94089; (408) 744-1430.

GammaLink's GammaFax NA includes a command-line interface that's very sophisticated—and more complex than necessary. Stick to the program's menu interface, which features a detailed transaction log and preview feature and the ability to combine text with graphics. The GammaFax NA can send and receive in background mode. You can even use the board to transfer files—but only to other GammaFax boards. Despite its sophistication, it feels like a hastily abbreviated version of a GammaLink network fax board, and badly documented at that. At $495, it should at least include a modem. **WT**

MAXFAX

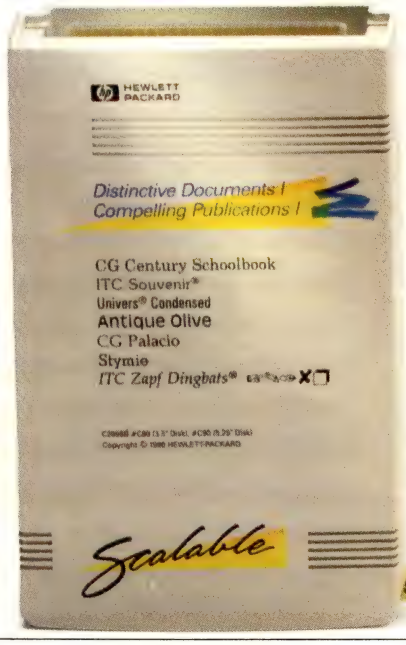
LIST PRICE: $349. **MACRONIX INC.**, 1348 Ridder Park Drive, San Jose, Calif. 95131; (408) 453-8088.

There's nothing bad you can say about the MaxFax—nor anything exceptional, for that matter. It packs a 2,400-bps modem, supports a wide range of file formats (PCX, WordStar, WordPerfect, Microsoft Word, MultiMate and Hi-Jaak's FAX extension) and is generally easy to use and install. It's shipped with bulletin board software, and the board will detect whether an incoming call is from a fax or a modem. If from a fax, it sends the call to the fax; a modem call will automatically be transferred to the modem and the bulletin board. Another nice feature: You can send faxes directly from the DOS prompt. Apart from that, nothing distinguishes this board—it's a merely adequate performer in a crowded field. **PG**

PERFECTFAX

List Price: $195 (no modem). Adtech Micro Systems Inc., 43120 Christy St., Fremont, Calif. 94538; (415) 659-0756.

If it weren't for the absurdly slow printer driver (four minutes to print one page of text on a Hewlett-Packard LaserJet III), The PerfectFax would contend with the best fax boards around. At $195, it offers no frills whatsoever—no text or graphics editor, no hot-key send function, no fancy file conversion engines. But its interface is wonderfully simple and consistent and includes an excellent fax log.



How many fonts can you get out of HP's scalable typeface cartridges?

HP scalable typeface cartridges give you more of what you bought an HP LaserJet III printer for: the variety and flexibility to make even simple memos look like you've gone the extra mile.

Each HP scalable typeface cartridge expands your printer's font set from 8 to 33 or *more* with a selection of popular typefaces that look great together. Plus matching screen fonts for WYSIWYG output. And everyone who shares the printer shares the wealth. Without downloading. Without using up memory. Because the typefaces are printer resident.

With HP scalable typeface cartridges you get more than great typeface styles. You get them in the exact

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The board sends and receives in background mode (though it takes over your PC while doing so) and lets you schedule, broadcast and view faxes both sent and received. Its view feature is slow and documentation is sparse, but adequate. If your faxes are infrequent and simple, this is a no-nonsense board that you can install and learn in about half an hour. **MARTY JEROME**

PROMETHEUS MAXFAX

LIST PRICE: $349. **PROMETHEUS PRODUCTS INC.**, 7225 SW Bonita Road, Tigard, Ore. 97223; (503) 624-0571.

Once you get past the cumbersome installation procedure, you'll find that the Prometheus Maxfax internal fax/modem boasts an impressive complement of features. It operates in background mode and supports native WordStar, WordPerfect and MultiMate file formats. You can easily combine text and graphics files in one transmission. The software also operates as a TSR for sending faxes so that you don't have to exit the foreground. The board has mail-merge capability and an excellent preview feature, and you can dump files directly to your printer. Prometheus supplies Mirror II communications software for the 2,400-bps modem. Unfortunately, these features don't make up for the awkward software interface and poor documentation. **WT**

SKYFAX 2.0

LIST PRICE: $399 (no modem). **EFCO SYSTEMS INC.,** 540 Weddell Drive, Sunnyvale, Calif. 94089; (408) 744-9001.

The SkyFax 2.0 comes with a curiously uneven complement of features. It includes both a text and graphics editor, but no hot-key send feature (you must manually copy files to an "out" folder). You can easily mix and match graphics and text in a fax, but the software doesn't generate a cover sheet. A preview feature is included. And the program sends and receives in background with relative competence. Our applications slowed and stumbled, but we still had use of our PC. The program's interface is menu-driven but inconsistent and often confusing. For $400, you can do considerably better. **MJ**

ZOLTRIX ZX1896

LIST PRICE: $199. **ZOLTRIX INC.**, 41394 Christy St., Fremont Calif. 94538; (415) 657-1188.

Fans of Bit Software's BitCom communications package, which is bundled with the Zoltrix ZX1896, will be mildly disappointed by this combination fax and modem. The fax interface is coherent, albeit ugly. You can rotate images before printing, and the package includes a handy screen or print capture feature. However, you can't integrate text with graphics (though you can combine them). File conversion is slow, and documentation is abysmal. The Zoltrix ZX1896's best feature is its DOS command line capability (you can *only* send faxes in background mode.) The package includes a 2,400-bps modem. **MJ**

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Top Downloads

BIX PICKS

December's picks will help keep you organized. We found these downloads on BIX (for subscription information call 800-227-2983) but you're likely to locate them on your favorite bulletin boards as well.

4Print: Save filing space and paper with 4Print, a utility that lets LaserJet users print four pages on one sheet of paper. Print two pages in condensed landscape mode on one side of paper, then flip the paper stack over and print on the other side, while retaining the original order of the pages. It's a time-saver (103.8K).

Bang: Search for a file across all of your logical drives with Bang. Sort files by date, size or attributes. Bang also lists filenames that occur more than once, and includes a "Where" utility for locating files across directories and subdirectories. Your version of DOS, however, may not include this handy feature (51.2K).

Scat: Bring diskettes formatted under earlier versions of DOS up to DOS 4.01 standards without losing data in the process. Some programs have problems working with older DOS diskettes; Scat places the disk volume labels in the boot track and root directory, then generates a unique volume ID and fills in all disk geometry fields. Disks upgraded to DOS 4.01 standards can still be used with earlier versions of DOS. As an added bonus, Scat also repairs a diskette's damaged or erased first sector (18.4K).

ToDir: A simple path-aliasing program, ToDir makes it easier to navigate through complex directory trees. Assign an alias to a subdirectory, and move across directories easily just by typing TODIR and the new pathname, avoiding forever the annoyance of typing long pathnames (11.2K).

WinClock: A digital clock for Windows 3.0, WinClock appears in front of other applications so you can see it while you work. Schedule two alarms to prompt you on a particular day or the hour, and attach a short note to each. WinClock has full windowing capability so that you can size it, move it or close it with the click of a mouse (16.4K).

Information Line

Put Your E-Mail on Speaking Terms with Other Systems

DASnet lets you reach users on more than 60 carriers.

By Dale Lewallen

TRYING TO SEND electronic-mail to someone who's not on your e-mail service can cost you an afternoon of great frustration—e-mail services remain confoundedly closed systems. DASnet, from DA Systems in Campbell, California, offers a simple, one-stop solution. DASnet acts as an interpreter for more than 60 e-mail services, including AT&T Mail, MCI Mail, EasyLink, Internet as well as a few surprising ones—including The WELL.

Although several carriers have built gateways to connect to other services (CompuServe and MCI subscribers, for example, can exchange messages without too much difficulty), such links are the exception rather than the rule. MCI users who want to send a message to their BIX or EasyLink counterparts, for example, are out of luck.

DASnet remedies this problem. The service lets you create and store messages on your primary e-mail system using DASnet's addressing syntax. DASnet then picks up the messages, translates them into the recipient carrier's addressing format and drops them into the appropriate mail box.

Since you don't have to learn a new interface or worry about connecting to gateways, addressing messages to those on other electronic-mail systems is surprisingly easy. All you need is some extra addressing syntax, which you add to your normal e-mail messages, and the e-mail ID of the person to whom you're sending a message.

Suppose you're an MCI user who wants to send mail to Bill Jenkins on GeoMail (ID: b.jenkins) about an upcoming meeting. At the "Send the mail to MCI ID:" prompt, you would enter "304-0160," which is DASnet's address on MCI. At the subject prompt, enter "B.Jenkins@GEO4!tomorrow's meeting." The "@" tells DASnet which carrier will receive the message; the exclamation point separates the address from the subject.

A message sent via DASnet generally arrives in the recipient's mailbox in an hour or two, depending on the promptness of your primary carrier and that of your recipient (DASnet dials into your carrier to check for messages throughout the day).

DASnet's security is on a par with that of other carriers. The company claims that only a few authorized personnel can access messages—and only when technical problems arise with transmission. Keep in mind, however, that the privacy of your message also depends on the security of your primary carrier and that of your recipient.

When two people exchange messages, only one needs to subscribe to DASnet, which is good news given the service's costs. In addition to the $33.50 startup fee, DASnet charges $4.75 per month and approximately 60 to 75 cents per message—both for sending and receiving. (Certain services, such as Connect and Unison, include DASnet already, sparing subscribers the startup and monthly fees.) For additional charges, DASnet also allows you to send messages by telex, fax or postal delivery. Your primary carrier probably has cheaper rates for these extra services, however.

While DASnet roughly doubles your monthly e-mail expenses, it can offer cost-savings. If you maintain mailboxes for sending or receiving with several carriers, DASnet may let you eliminate one or more services. Many users find the convenience of having a single e-mail address invaluable. If you subscribe to DASnet primarily to receive messages, however, be prepared to instruct senders on how to use the DASnet address syntax from their carrier. It's the price you pay for one-stop e-mail.

DASNET

LIST PRICE: $33.50 startup; $4.75 per month; 60 to 75 cents per message.

DA SYSTEMS INC., 1503 E. Campbell Ave., Campbell, Calif. 95008; (408) 559-7434

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"... the equal of other high end accounting programs in every way but cost."
New York Times, July 1, 1990

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Minimum Hardware Requirements: IBM or compatible computer with 640Kb, hard disk, monochrome or color monitor, mouse optional, MS-DOS 2.1 or later for single users (3.1 or later for networks), 132 column dot matrix printer in compressed mode.

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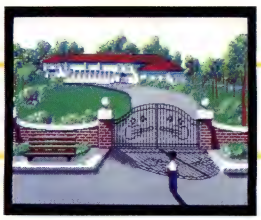
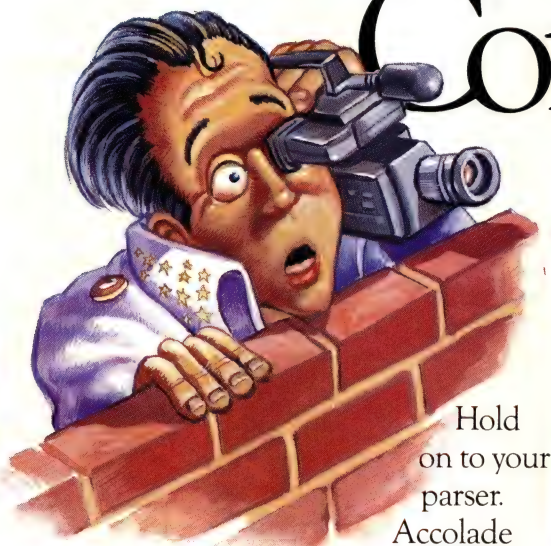
"He Ain't Nothing But a Corn Dog." Can a man who wears polyester slacks and "Alf" pajamas impress the stunning Stella Hart?



"Heartbroke Motel?" Help Les Manley solve engaging puzzles. See genuine felt paintings. Animation so real your hips will gyrate.

CAUTION: Th Contain Gr



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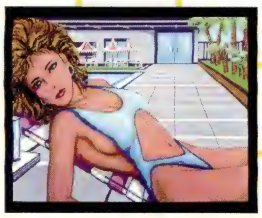

"I Want a Hunk Of Burnin' Les." Just one of the beautiful babes our hero Les Manley could stumble upon. Got any cocoa butter?

"Lift Me Tender." Want more? Get Les 70 bit mapped screens make Search fo King one heavy animated graphic adve

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e minute you're a guy eating nacho-ed popcorn. The next, you're sucked your TV into a fantastic alien world

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looking for high adventure, Accolade has two graphic examples. How to order: Visit your favorite retailer or call 1-800-245-7744.

Altered Destiny was written and designed by Michael Berlyn creator of Infidel™ and Suspended.™ Author of The Eternal Enemy

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of the game. Other versions may vary.
perty of their respective owners.

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Games and Leisure

Top Your Shopping List With 1990's Best Games

Sound, video and high-resolution VGA graphics make this season's picks better than ever.
Compiled by Carol Ellison

STUMPED ABOUT WHAT TO GIVE THE PC aficionado on your holiday list? Worry no longer—we've surveyed this season's crop of PC games to bring you our guide to the packages most likely to satisfy everyone on your list.

The newest games blend technology and entertainment in fascinating ways. For example, Dynamix's Oriental mystery games feature live actors in videos that are scanned as graphics. Meanwhile, archcriminal Carmen Sandiego and her henchmen talk directly to you in the new VGA Deluxe version of Where in the World Is Carmen Sandiego? And a talking Brave King Graham resurfaces in a new multimedia CD-ROM version of King's Quest; this latest chapter also includes an original sound track.

Flight simulators, too, are looking better than ever. Gone are the polygon scenery graphics of yore; instead, detailed VGA bitmaps in new programs from Sierra Online and Lucasfilm Games keep the action lively by taking advantage of today's fast PCs and innovative programming. So get out your list and check it twice. There's something here for every game fan among your family and friends—and maybe there's even something for you.

When henchmen speak, the Sphinx listens in a greatly enhanced old favorite, Where in the World Is Carmen Sandiego?

Where in the World Is Carmen Sandiego?

Those who liked Carmen in earlier releases of Broderbund's popular educational games will love her this time around. Put this package under the tree with a sound card: Carmen and her cohorts now talk as they traverse a globe that's richly illustrated in digitized, VGA-quality photos from the National Geographic Society. You must have VGA video and plenty of hard disk space to install and load the game. And without a sound card, you'll miss the voices and enhanced musical score. But this one is so good, it's worth the upgrade. **CE**

WHERE IN THE WORLD IS CARMEN SANDIEGO? DELUXE EDITION LIST PRICE: $79.95. **REQUIRES:** 10MHz 80286 PC compatible with VGA video and 640K and 6MB free hard disk space. **OPTIONS:** Ad Lib, Sound Blaster, Tandy or Roland MT-32 sound card. Not copy-protected. **BRODERBUND SOFTWARE**, 17 Paul Drive, San Rafael, Calif. 94903; (800) 521-6263, (415) 492-3200.

King's Quest V

King's Quest V will thrill the most difficult-to-please person on your list while engaging even hardened PC-game de-

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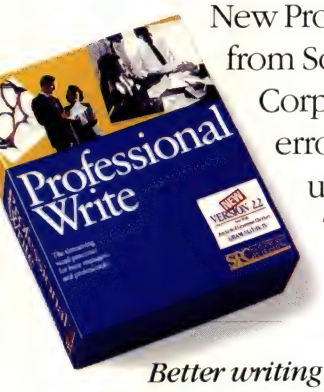

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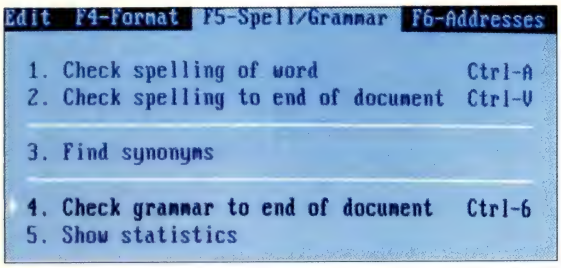
New Professional Write® 2.2 from Software Publishing Corporation detects errors in grammar, style, usage and punctuation. Then recommends a way to correct them.

This new version also supports many more printers, including HP® LaserJet® III, LaserJet IIP, and DeskJet® Plus. And offers a new line of HP font support, as well as the 25 in One!™ III cartridge from Pacific Data Products.



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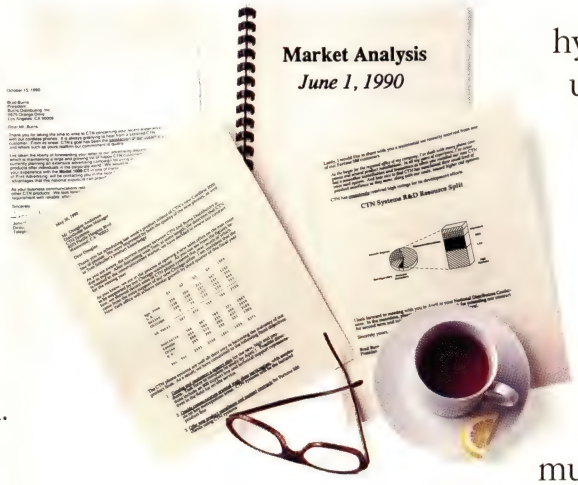

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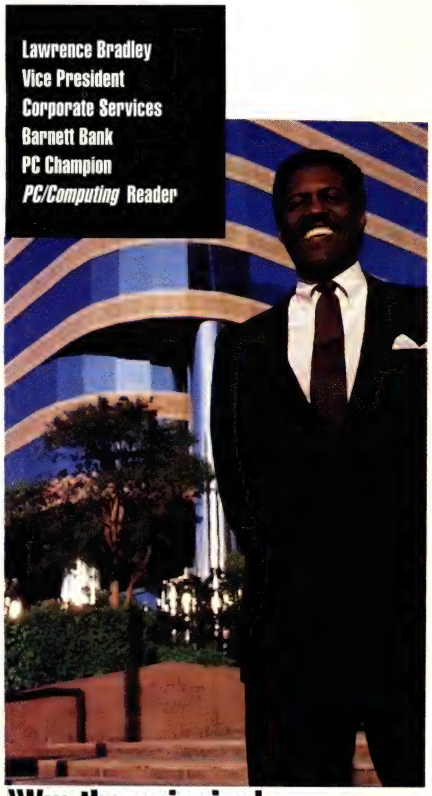

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PCComputing

tractors. Technology mavens will be impressed by the many special effects in the CD-ROM version of King's Quest V. Those on a tighter budget should investigate the floppy disk version, which is almost as impressive. Although it lacks the original sound track produced for the CD version, this offering possesses much the same animation in rich, high-resolution 256-color VGA graphics. **CE**

KING'S QUEST V
LIST PRICE: $59.95 (floppy disk version), $69.95 (CD-ROM version). **REQUIRES:** 512K RAM. **OPTIONS:** Ad Lib, Sound Blaster or Roland LAPC-1 sound card. Not copy-protected. **SIERRA ONLINE**, P.O. Box 485, Coarsegold, Calif. 93614; (800) 326-6654.

Mixed-Up Mother Goose

Fairy tales will come true for the youngsters in your house with Sierra's CD-ROM version of Mixed-Up Mother Goose. Miss Muffet, Little Jack Horner and their friends speak to kids at the keyboard, challenging them to unite the characters with their appropriate tuffets, plum pies and the like. The game also comes on floppy disk or bundled with a sound card and CD-ROM reader for just $700. It includes hours of digitized voice and cinematic animation in 256-color VGA graphics. Like King's Quest V, the game's attention to technical detail will charm both the young and the young at heart. **CE**

MIXED-UP MOTHER GOOSE
LIST PRICE: $39.95 (floppy disk version), $59.95 (CD-ROM version). **REQUIRES:** 512K RAM. **OPTIONS:** Ad Lib, Sound Blaster or Roland LAPC-1 sound card. Not copy-protected. **SIERRA ONLINE**, P.O. Box 485, Coarsegold, Calif. 93614; (800) 326-6654.

Faces...TrisIII

Fans of the top-selling Soviet PC games Tetris and Welltris will appreciate Spectrum HoloByte's Faces...TrisIII, which puts a human face on Soviet designer Alexey Pazhitnov's popular falling-brick games. In Faces...TrisIII, you build faces out of individual blocks that represent facial features (chin, mouth, nose, eyes and forehead) instead of layering clusters of falling blocks into rows and columns, as you do in Tetris and Welltris. **PAM ROBINSON**

FACES...TRISIII
LIST PRICE: $39.95. **REQUIRES:** 512K RAM (640K for VGA). **OPTIONS:** VGA strongly recommended; joystick and Ad Lib or Sound Blaster sound card. Copy-protected by documentation. **SPECTRUM HOLOBYTE**, 2061 Challenger Drive, Alameda, Calif. 94501; (415) 522-3584.

Red Baron

PC pilots who love the challenge of Microsoft's Flight Simulator but spurn its flat, uninteresting landscapes will delight in Dynamix's Red Baron, a World War I dogfight flight simulator with bit-mapped scenery. Digitized 256-color VGA graphics produce the three-dimensional effects. The rich graphics make the action only slightly slower than that found in flight simulators with boring scenery. But that only adds to the realism. After all, the planes of that era were slower, too. **CE**

The Red Baron flies again, this time in high-resolution VGA bit-mapped graphics, in Dynamix's new World War I flight simulator.

RED BARON
LIST PRICE: $59.95. **REQUIRES:** 640K RAM. **OPTIONS:** Ad Lib, Sound Blaster or Roland LAPC-1 sound card. Not copy-protected. **DYNAMIX, A DIVISION OF SIERRA ONLINE**, P.O. Box 485, Coarsegold, Calif. 93614; (800) 326-6654.

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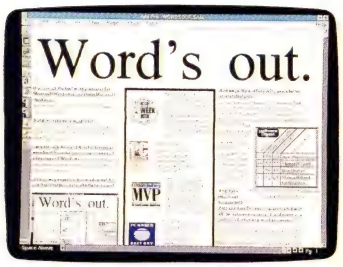

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Because only Amí and Amí Professional were built from the ground up to take full advantage of Windows. Which is why they're recognized as the easiest and most intuitive of all word processors.

It's also why experts acknowledge that Amí and Amí Professional make the best use of Windows' WYSIWYG environment. Instead of relying on archaic "page previews" like Word for Windows, Amí lets you create, see, and edit all elements of your document — text, graphics, even footnotes, headers and footers — in a variety of fully editable views.

Graphics are easier to handle, too. Because Amí "frames" (which can also contain text for page-within-page formats) are true "pick up and place" objects that can be quickly and accurately positioned and sized on screen.

*PC Week Poll of Corporate Satisfaction**

- Amí Professional received a score in Ease of Use of the User Interface that was fully 10 points higher than the next highest score, and came in 14 points ahead of the score WordPerfect 5.1 drew from its buyers.

PC Magazine Editor's Choice

- Of all GUI word processors, Amí Professional has the widest variety of features and is perhaps the most enjoyable to use.

PC Computing MVP

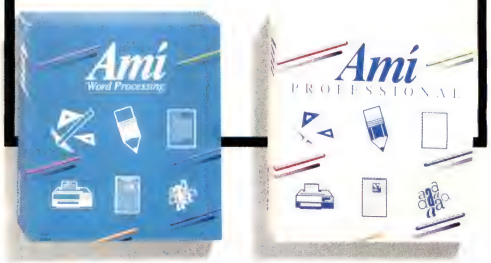
- A stunning achievement, one that no other PC word processing product— not even Microsoft's estimable Word for Windows — can claim to have reached.

PC World Best Buy

- Amí Pro's easy to use formatting tools are hard to resist. If your documents typically include graphics, it's your Best Buy.

Infoworld Excellent Value

- Easily handles graphics mixed with text, imports a host of text and graphics formats effortlessly, and does other office chores such as mail merge with ease and power.



And we get the nod for giving users better access to features. Our unique dialog boxes provide visual feedback that lets you see the results of your choices immediately, without having to reformat the document until you know exactly how it will look. Plus, our shortcut icons — which eliminate the need to use pull down menus — are changeable. So you can use the ones that correspond to the functions you use the most.

Software Digest Ratings Report: Rating	Overall Evaluation	Overall Power	Program Name
★★★	7.9	6.9	Amí Professional
★★★	7.7	7.7	Microsoft Word
★★★	7.6	8.1	Word Perfect
★★★	7.2	6.7	Microsoft Word for Windows

Software Digest rates Amí Professional as the best word processor for Windows and the best word processor overall.

And that's important because both Amí and Amí Professional are loaded with all the features you demand, and many you just can't find in any word processor. Including tables that let you perform basic math. Charts and graphs. A drawing program. Dynamic Data Exchange with other Microsoft Windows applications. And style sheets that make it easy to create sophisticated-looking documents — like this ad!

So whether you're an executive type who types only occasionally, or a heavy user who needs lots of specialized features, one of these programs is definitely your type. Even the experts agree.

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The Demonstration Version of Amí Professional is a fully functional version of the product, except for the thesaurus, some import/export filters, and the ability to save files. The demonstration version requires Windows 2.11 or Windows 3.0.

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Lucasfilm Games. Secret Weapons brings a compelling plot and a World War II scenario to an air combat simulator game that unfolds in vivid bit-mapped detail. The story line is rooted in fact. Five of the nine enemy planes shown onscreen were actually designed by Nazi engineers, although they never saw action. The game presumes that the Nazis had, in fact, deployed their "secret weapons," and you must defeat them in order to save the Allies. **CE**

SECRET WEAPONS OF THE LUFTWAFFE
LIST PRICE: $59.95. **REQUIRES:** 10MHz 80286 or better; 640K RAM (supports EMS); CGA, EGA, VGA or MCGA video. **OPTIONS:** mouse, joystick or keyboard input; Ad Lib or Sound Blaster sound card. Copy-protected by documentation. **LUCASFILM GAMES**, P.O. Box 10307, San Rafael, Calif. 94912; (415) 721-3300.

Mickey Mouse

Disney is delving into the PC games market. These three offerings are just the first in a new line of preschool games that feature the characters and musical themes made popular with the company's classic cartoons. Mickey's 123's, Mickey's ABC's and Mickey's Colors & Shapes teach youngsters their numbers, alphabet and colors to tunes that their parents will remember from "Mickey Mouse Club" days. In order to hear them, you must have a Sound Source, a $34.95 external sound device also sold by Disney. If, as a gift giver, you're concerned that Mom and Dad might not appreciate your intrusion in Junior's education, consider giving them the four-minute consumer video that Disney has prepared to let potential game buyers preview the software. The video's $5.95 price can be applied toward the purchase of any program. **CE**

MICKEY'S 123'S
MICKEY'S ABC'S
MICKEY'S COLORS & SHAPES
LIST PRICE: $49.95 each. Combination of Mickey's ABC's and Sound Source, $69.95. **REQUIRE:** 512K RAM; CGA, EGA, VGA, MCGA or Tandy 1000 video; DOS 3.0. **OPTIONS:** Sound Source. Copy-protected by documentation. **WALT DISNEY COMPUTER SOFTWARE INC.**, 500 S. Buena Vista St., Burbank, Calif. 91521; (818) 567-5360. For the video, send $5.95 to: **WALT DISNEY COMPUTER SOFTWARE**, 1145 N. Ellis St., Bensenville, Ill. 60106.

The Secret of Monkey Island

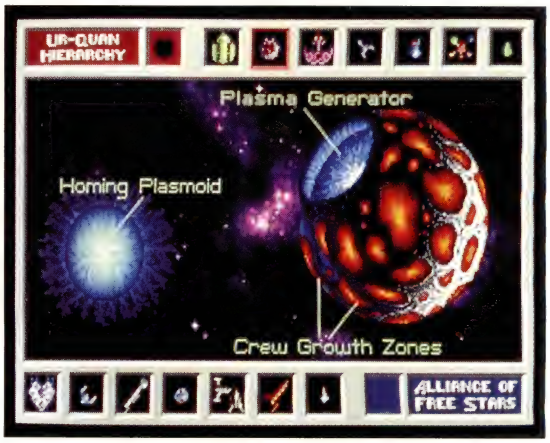
Fans of swashbuckling romance will love The Secret of Monkey Island. This graphical adventure game spins a yarn that suggests a PC adaptation of Robert Louis Stevenson's classic of the high seas, *Treasure Island*. It takes you on a search of the Caribbean—complete with pirates, parrots and enough yo-ho-hos and pixel-painted bottles of rum to keep you smiling while you solve the mystery of Monkey Island. **CE**

Scrollable VGA graphics provide the panoramic scenery of Lucasfilm's adventure game The Secret of Monkey Island.

THE SECRET OF MONKEY ISLAND
LIST PRICE: $59.95. **REQUIRES:** 10MHz 80286 or better; 640K RAM. **OPTIONS:** mouse, joystick or keyboard input; Ad Lib or Sound Blaster sound card; CGA, EGA, VGA or MCGA video. Copy-protected by documentation. **LUCASFILM GAMES**, P.O. Box 10307, San Rafael, Calif. 94912; (415) 721-3300.

Star Control

Full 256-color VGA graphics make Accolade's Star Control among the best space conquest games of the year—the perfect gift for friends who are hooked on "Star Trek" reruns. As captains of the Free Alliance federation, they'll roam a three-dimensional star cluster, battling the starships of the evil Ur-Quan Hierarchy and freeing worlds and quadrants. The game's interstellar graphics are impressive on a VGA monitor. Friends with anything less on their desk, however, won't be fazed; for them, Star Control will resemble any other shoot-'em-up space game. **CE**



Accolade's Star Control applies impressive high-resolution graphics to an old game theme.

STAR CONTROL
LIST PRICE: $49.95. **REQUIRES:** 512K RAM (640K for VGA). **OPTIONS:** CGA, EGA, VGA, MCGA, Tandy 16 color; joystick; Ad Lib, Tandy, CMS or Roland MT-32 sound board. Copy-protected by documentation. **ACCOLADE**, 550 S. Winchester Blvd., Suite 200, San Jose, Calif. 95128; (408) 985-1700.

The Dark Heart of Uukrul

For the adventure fantasy fans on your holiday list, consider the Wizard of Oz–like challenge of Broderbund's Dark Heart of Uukrul. Your virtuous band of four wends its way through tortuous mountain passes, depicted in detailed graphics, to find the heart of Uukrul and then free the downtrodden city of Eriosthe. There's plenty of magic and animated fantasy in this game, but no one breaks into song while merrily skipping down the road—The Dark Heart of Uukrul is completely silent. **PEGGY WALLACE**

THE DARK HEART OF UUKRUL
LIST PRICE: $24.95. **REQUIRES:** 256K RAM. **OPTIONS:** CGA, EGA, VGA, MCGA, Tandy 1000 and Hercules monochrome graphics. Copy-protected by documentation. **BRODERBUND SOFTWARE**, 17 Paul Drive, San Rafael, Calif. 94903; (800) 521-6263, (415) 492-3200.

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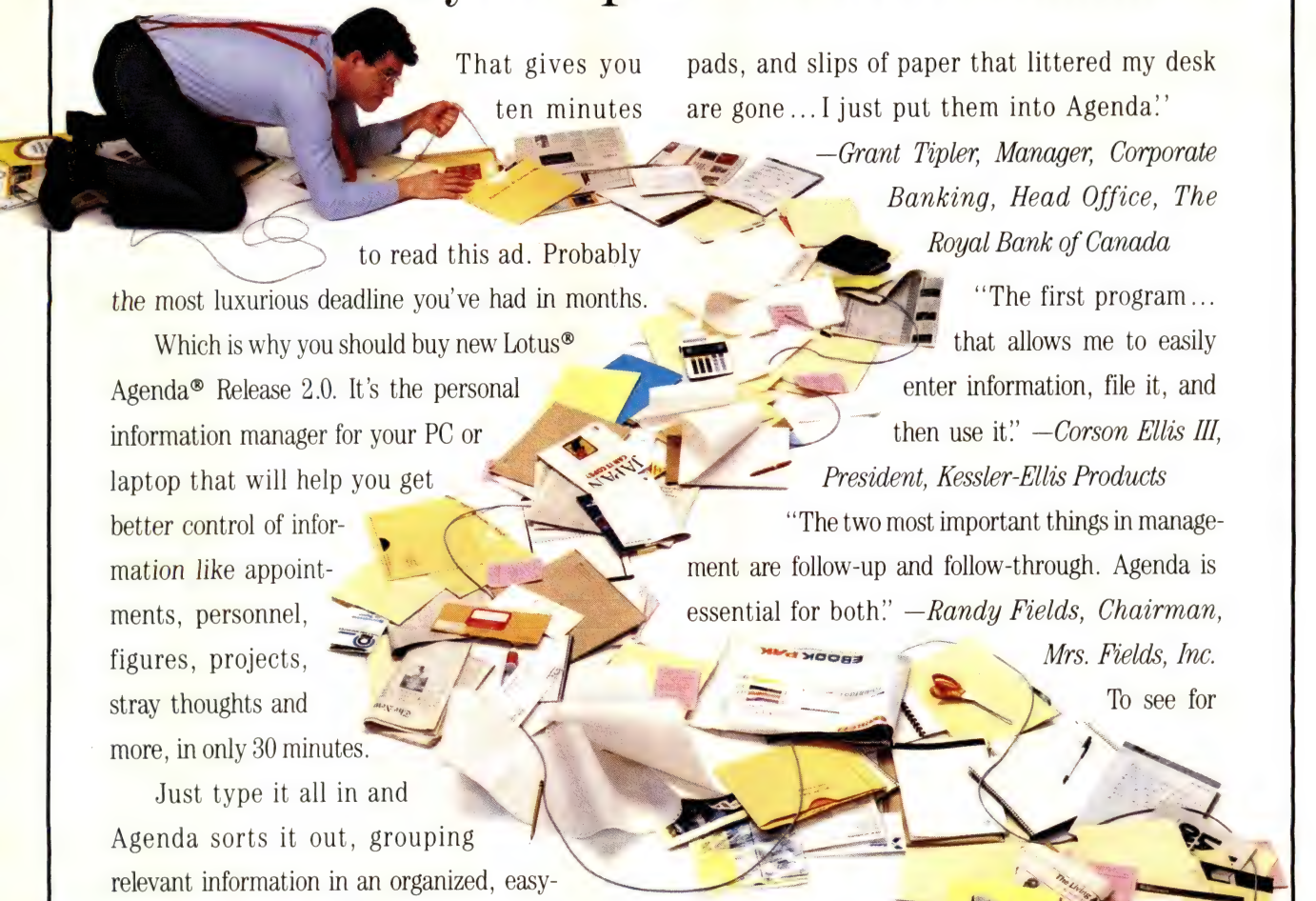

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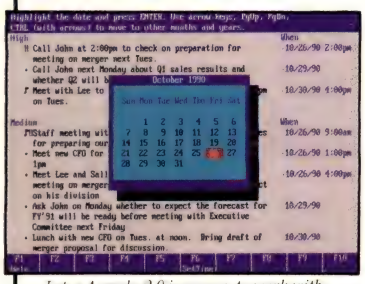

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Real Blackjack, Real Poker

Gamblers who are keen on playing blackjack and poker but not on losing real money will enjoy Edward O. Thorp's Real Blackjack and Amarillo Slim's Real Poker. Although they're not as raucously entertaining as a Friday night card game with a bunch of friends, these two programs will teach you enough about cards to make their $49.95 list price worth a gamble. Both serve as excellent tutorials, revealing the tips and strategies that made Thorp, a former math professor and Wall Street whiz, and Slim, the 1972 World Champion of Poker, two of the top names in gaming circles. These games are as fun to play as they are instructive. **KATHLEEN RICHARDS**

EDWARD O. THORP'S REAL BLACKJACK
AMARILLO SLIM'S REAL POKER
LIST PRICE: $49.95 each. **REQUIRE:** 384K RAM (Blackjack), 256K RAM (Poker); CGA, EGA or VGA color monitor. Not copy-protected. **VILLA CRESPO SOFTWARE,** 1725 McGovern St., Highland Park, Ill. 60035; (800) 521-3963, (708) 433-0500.

Car Builder

Weekly Reader's Car Builder is for puzzle fans, model makers and those people who would prefer to be tinkering with their cars but find the garage a trifle chilly this time of year. Here's their chance to assemble heavy vans and high-speed sports cars using clip art auto parts. Car Builder includes no drawing tools, so it's not for aspiring engineers. Consider it more of a game with low-end CAD elements thrown in. **TREVOR EDDY**

Car Builder returns statistics on automotive design as you build your dream car.

CAR BUILDER
LIST PRICE: $49.95. **REQUIRES:** 256K RAM. **OPTIONS:** CGA, EGA or VGA. Not copy-protected. **OPTIMUM RESOURCE INC./WEEKLY READER SOFTWARE,** 10 Station Place, Norfolk, Conn. 06058; (800) 327-1473, (203) 542-5553.

M1 Tank Platoon

Friends and family members who've given up on *glasnost* will be delighted to find MicroProse's M1 Tank Platoon: The Definitive Simulation of Armored Land Combat under their tree this season. Tank Platoon is a fast-paced and exciting strategy game whose three-dimensional graphics make the action on the "16,000 acre" battlefield more realistic. You command a 16-

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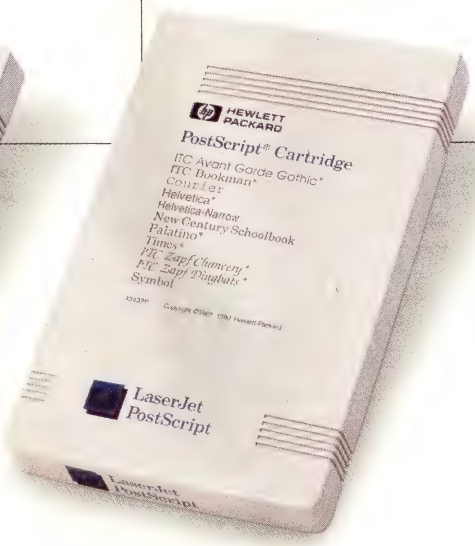

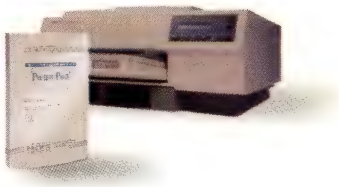

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PhoenixPage

That's a Fortune 500 company stuck behind the red Chevette.

Taking work home can be a disaster.

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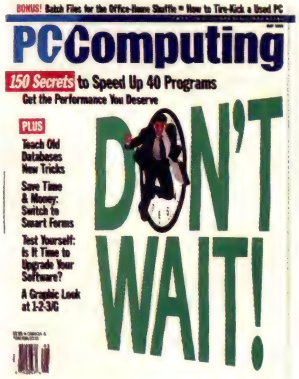

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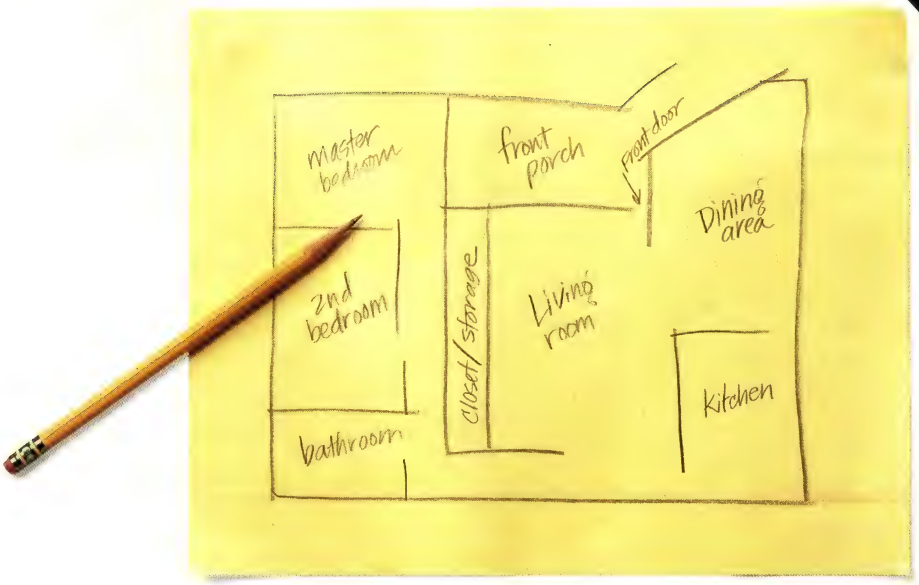

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M1 TANK PLATOON: THE DEFINITIVE SIMULATION OF ARMORED LAND COMBAT
LIST PRICE: $69.95. **REQUIRES:** 512K RAM. **OPTIONS:** CGA, EGA, VGA, MCGA, Hercules or Tandy 1000 video; joystick recommended. Supports the Ad Lib and Roland LAPC-1 sound boards. Copy-protected by documentation. **MICROPROSE SOFTWARE INC.**, 180 Lakefront Drive, Hunt Valley, Md. 21030; (301) 771-1151.

Flight of the Intruder

Flight Simulator fans will want to rise to the challenge of Flight of the Intruder, which simulates the A-6 and F-4 aircraft used in Vietnam. Landing a jet bomber on the heaving surface of an aircraft carrier by moonlight is just one of the many tasks you'll face in this exciting mission-strategy game (you'll even hear your brakes screech if you play with a sound card). Intruder's two-player mode lets you link to a friend's PC via modem to stage an interactive dogfight. Pack plenty of RAM, however, because Flight of the Intruder won't even load if you have less than 565K free. **J. SCOT FINNIE**

FLIGHT OF THE INTRUDER
LIST PRICE: $59.95. **REQUIRES:** 640K RAM. **OPTIONS:** CGA, EGA or VGA graphics; joystick or mouse; Ad Lib sound card. Not copy-protected. **SPECTRUM HOLOBYTE**, 2061 Challenger Drive, Alameda, Calif. 94501; (415) 522-3584.

Nemesis Go

Fans of Go, the Oriental strategy board game, will relish the PC versions of the game. Like PC chess, their Occidental counterpart, these games are designed to teach game strategies and to build your acumen as well. They're also fun to play. Go is available in five versions: Nemesis Go Master, $79, the basic game; Nemesis Joseki Genius, $49, a tutorial on professional "corner" openings for the game; Nemesis Go Junior, $35, an easy-to-play subset of Go Master designed for newcomers; Nemesis Tacti-

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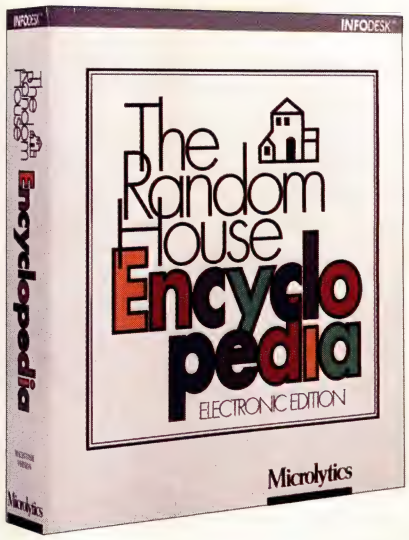

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cal Wizard, $59, a tutorial on the "life and death" tactics of Go; and Go Master Deluxe, $169, which combines all of the above versions. **CE**

GO PRODUCTS
REQUIRE: All Nemesis Go games require 512K RAM. Shipments to the continental United States cost $6.50 per game. **OPTIONS:** CGA, EGA, VGA; mouse or keyboard. Not copy-protected. **TOYOGO INC.**, P.O. Box F, Dept. D, Kaneohe, Hawaii 96744; (800) 869-6469.

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LIST PRICE: $59.95 each. **REQUIRE:** 640K RAM. **OPTIONS:** Ad Lib, Sound Blaster or Roland LAPC-1 sound card. Not copy-protected. **DYNAMIX, A DIVISION OF SIERRA ONLINE,** P.O. Box 485, Coarsegold, Calif. 93614; (800) 326-6654.

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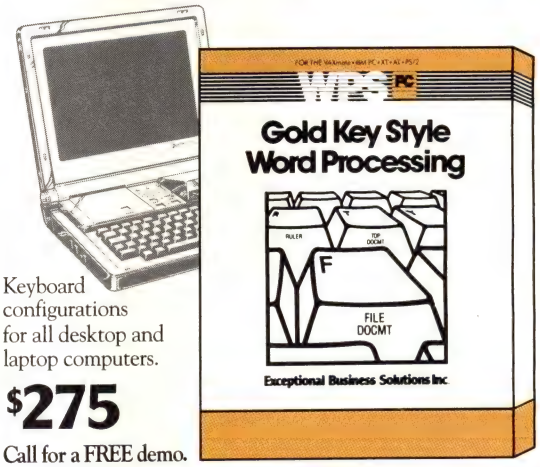

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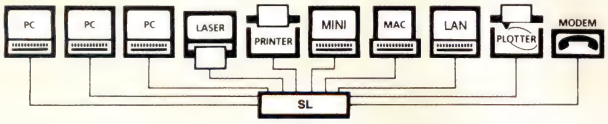

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LIST PRICE: $59.95. **REQUIRES:** 512K RAM (640K for VGA). **OPTIONS:** joystick or mouse; Ad Lib sound card. Copy-protected by documentation. **ELECTRONIC ARTS**, 1820 Gateway Drive, San Mateo, Calif. 94404; (800) 245-4525, (415) 571-7171.

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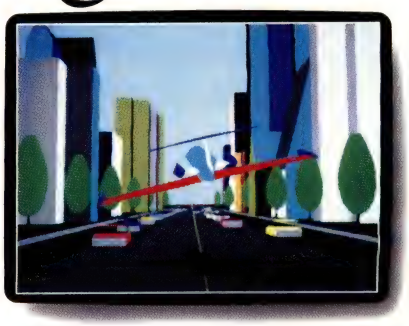

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Personal Finance

Planning to Refinance? Look Before You Leap

A Mortgage Refinancing Worksheet can tell you if it makes sense.

By Stephen L. Nelson

HOMEOWNERS OBSERVE A WEEKLY ritual. Clad in bathrobes and clutching cups of coffee, they patiently leaf through the Sunday paper in search of ads for lower mortgage interest rates. The exercise has merit, since refinancing can reduce monthly mortgage payments by as much as $100. But it costs a bundle to refinance. How do you determine if it makes sense for you? These Mortgage Refinancing Worksheets, one for Excel and one for 1-2-3, provide the answer.

In Part 1, enter the loan balance on your current mortgage in B2 and its current annual interest rate in B3. Enter the interest rate on the refinancing loan in B4. Enter the number of payments remaining on your current mortgage in B5. The worksheet model uses this number to calculate your current mortgage payment and your new, refinanced mortgage payment, even though the number of payments on the refinanced mortgage won't be the same. The mortgage analysis worksheets show what the new mortgage payments must be if you're to pay off the new mortgage as quickly as the old.

Refinancing fees, which you'll enter in B6, should reflect the total cost in dollars and must include the loan origination fee and appraisal, credit report and other fees associated with refinancing. Do not include the interest that will accrue between the time you refinance and the time you make your first payment on the new mortgage. This really isn't a new cost; you would have had to pay the interest on the old mortgage anyway.

The Number of Months until Next Refinancing that you enter in B7 is your estimate of how long it will be before you refinance a second time or, more likely, pay off the mortgage by selling the house. This input tells the template how long you'll enjoy the lower interest rate. If you're planning to sell the house in two years, for instance, enter 24 months. If you do not plan to sell the house, enter the number of remaining mortgage payments (the same input you entered in B5).

Part 2 of the worksheet calculates the current payment, the refinanced mortgage payment and the difference between the two. The payments shown in

A Guide to Lower Rates

Excel

	A	B
1	**Part 1.** Mortgage Information	
2	Mortgage balance	
3	Current interest rate	
4	Refinanced interest rate	
5	Number of mortgage payments	
6	Refinancing fees	
7	Number of months until next refinancing	
8	**Part 2.** Payment Comparison	
9	Current mortgage payment	=ROUND(PMT((B3/12),B5,-B2),0)
10	Refinanced mortgage payment	=ROUND(PMT((B4/12),B5,-B2),0)
11	Difference in payments	=B9-B10
12	**Part 3.** Return on Refinancing Fees	=RATE(B7,B11,-B6)*12

1-2-3

	A	B
1	**Part 1.** Mortgage Information	
2	Mortgage balance	
3	Current interest rate	
4	Refinanced interest rate	
5	Remaining mortgage payments	
6	Refinancing fees	
7	Number of months until next refinancing	
8	**Part 2.** Payment Comparison	
9	Current mortgage payment	@ROUND(@PMT(B2,B3/12,B5),0)
10	Refinanced mortgage payment	@ROUND(@PMT(B2,B4/12,B5),0)
11	Difference in payments	+B9-B10
12	**Part 3.** Return on Refinancing Fees	
13	When this value equals zero	@ROUND(@PV(B9,B14/12,B7)-(@PV(B10,B14/12,B7)+B6),-1)
14	Interest rate earned on refinancing fees	

Refinancing makes sense when it produces a higher rate of return than what you would earn on other investments, as shown in B12 of the Excel template and B14 of the 1-2-3 template.

B9 and B10 assume you'll pay off the mortgages over the same number of months. (Your actual refinanced payment will be slightly smaller if you pay off the new mortgage over a longer period of time than it would have taken you to pay off the old.)

Part 3 determines whether it really makes sense to refinance. This part of the template treats the refinancing fees as an investment that pays a return or interest rate. Your return from refinancing should exceed the return on other investment opportunities; for example, if refinancing fees of $2,500 will save you 11 percent over the length of time you stay in your house, you shouldn't refinance if another investment opportunity will earn 14 percent. Remember too that one "investment opportunity" is to pay off your current mortgage. Accordingly, the return on the refinancing fees should surpass the interest rate on the current mortgage.

Notice that Excel has a function (RATE) that calculates loan interest rates in a single formula. 1-2-3, however, does not provide a suitable @ function for the job. Calculating the return on refinancing fees in 1-2-3 will be a matter of trial and error. Enter different interest rates in B14 until you find the rate that returns a value of zero in B13.

Here's a tip: If the value in B13 is a negative number, enter a lower interest rate in B14; if it is a positive number, enter a higher interest rate. You'll soon converge on an interest rate that sets B13 to zero. For example, if a guess of 9 percent returns a value in B13 of $75 and a guess of 10 percent returns a value of negative $75, the actual interest rate lies in between—probably 9.5 percent.

Stephen L. Nelson, a CPA and consultant in Seattle, is the author of Lotus 1-2-3 Money Manager *(Microsoft Press) and* Using Quicken *(Que Corporation).*

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LIST PRICE: $219.98. **REQUIRES:** 256K RAM; DOS 2.0 or later. **MECA VENTURES INC.**, 327D Riverside Ave., Westport, Conn. 06880; (203) 222-9150.

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Conceptually and functionally, very little has changed in Version 7.0. But if you liked the way Andrew Tobias' Managing Your Money has always looked and worked, you're in for a big adjustment.

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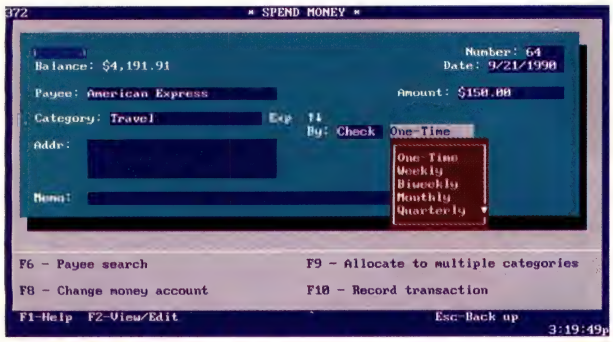

Managing Your Money 7.0 allows you to access budget categories and the new Check Alert function from the check-writing screen.

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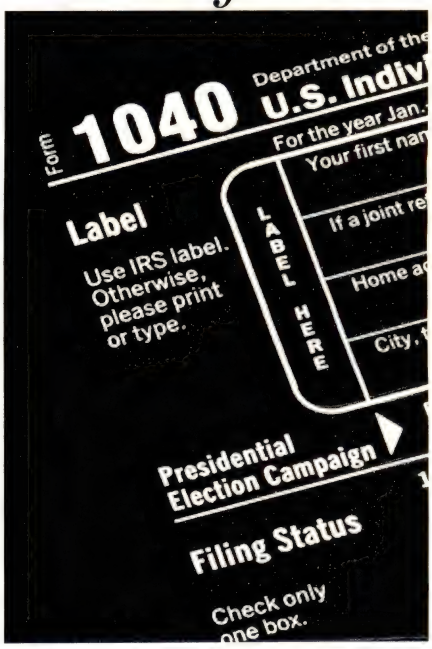

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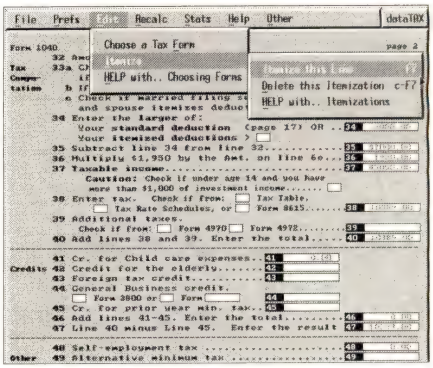

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Hard Disks Die.

Hard disk manufacturers want us to believe that hard disk technology is absolutely reliable ... but experience teaches otherwise. We depend upon data storage to be flawless, but hard disk technology isn't. Surface defects, head alignment drift, and low-level format aging cause hard disks to fail.

A hard disk drive's low-level format fades with use. The drive's read/write heads lose their delicate alignment and move away from the original low-level format information. These new data track locations intersect unseen surface defects that were once harmlessly located between tracks. DOS's chilling "Abort, Retry, or Fail ?" message inevitably results. Precious data is soon lost.

If left unchecked, data storage becomes more an act of hope and faith than one of science.

A return to science. The problem is known and understood, and the solution is clear. While a drive's data can still be read, the drive must be given a new, realigned and strong low-level format. Then all current surface defects must be located and managed. This process prevents hard disk data loss.

An act of prevention. Gibson Research Corporation's SpinRite™ software program reads hard-to-read and impossible-to-read data from a DOS hard disk, nondestructively low-level reformats the drive's surface while optimizing the sector interleave factor, analyzes and scrubs each track of the drive for surface defects, and relocates any endangered data to safety. SpinRite easily restores hard disk drives to better-than-new condition with their data intact. Before any data is lost, SpinRite detects that a drive is "softening" then determines and eliminates the cause. SpinRite readily recovers data that the system cannot read.

SpinRite won Byte Magazine's prestigious Award of Distinction and continues to win computer industry praise and acclaim. It has proven itself to be effective in preventing hard disk failure. SpinRite will work for you.

SpinRite II features a detailed technical log, as well as support for DOS 4 and large device driver partitions. It is available immediately from local software retailers or directly from Gibson Research with a 30-day satisfaction guarantee.

Suggested retail price: $89.

To receive additional literature or to purchase SpinRite II, call toll-free:

(800) 736-0637.

SpinRite II.

A return to science.
An act of prevention.

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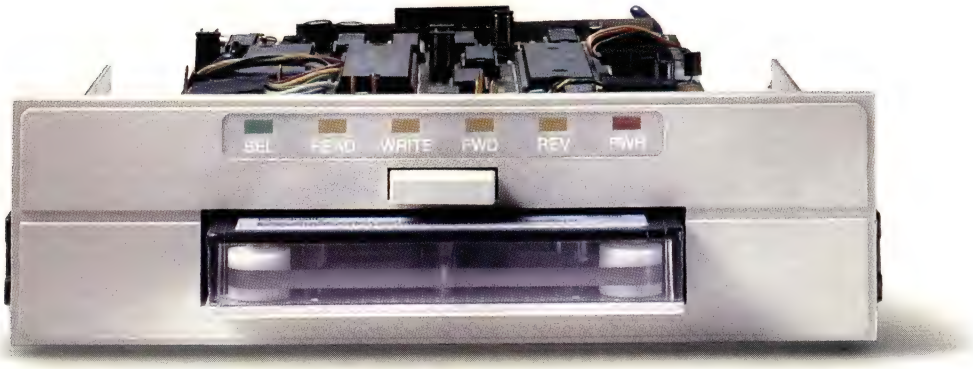

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CIRCLE NO. 130 ON READER SERVICE CARD.

bar offers access to money, tax, insurance portfolio, net worth and other features. Each menu option ties to a single financial database, so now it takes just a few keystrokes to jump from the check register to the tax estimator, for example, where it used to take more than a minute of function-key pressing to get from one chapter to another. Better yet, you have instant access to the reminder pad, card file, calendar and calculator using a control-key combination.

Gone, too, is the use of the escape key to bring up Help. Instead, that key is used to back out of screens and menus (as it should be), and F1 summons the only truly entertaining Help system known to software. Tobias explains with wit and financial wisdom not only how to use the software but also some of the more complex financial issues and what they could mean to you.

Meca has kept enough that is familiar to help diehards make the transition from Version 6.0 to 7.0. Many screens look similar and the program still uses function keys to execute commands. But a few changes to the function keys are especially frustrating until you get the hang of the new program. F8 used to sort check-register entries; now F9 sorts. And record transaction has moved from F1 (now used for *Help*) to F10.

Powerful New Features

These minor annoyances are well worth it for the new features that make Version 7.0 the most powerful personal finance manager you can buy. For the first time, Managing Your Money allows several levels of password protection. A new Check Alert feature reminds you when you have bills to pay. This feature is integral to the check-writing module, allowing you to add payees to the alert register on the fly. Managing Your Money displays a message when bills are due to be paid, allowing you to initiate the payments directly from the Check Alert Register.

A transfer feature makes it a snap to move funds among accounts; no more calling up one register, making a debit, saving the register, opening a second register and making a credit entry.

The Analysis menu is packed with enough financial calculators—including Inflator/Deflator, mortgage refinancing, loan amortization, yields, buy/lease/rent and compound interest—to keep a Harvard MBA entertained for hours. For those who want straight answers to financial what-if queries, each of these financial-analysis functions is thoroughly explained in Tobias's enjoyable style.

The Portfolio menu has been filled out with a "Bullishness Index" that combines historical facts about the stock market with current market information and data that you provide about a particular stock. The program calculates the index on a scale of 1 to 10, where 1 means steer clear and 10 indicates the chance of a lifetime. The index comes with all the caveats you'd expect, but it's an interesting way to get an opinion other than your own gut feeling on an investment's potential.

These new features make Managing Your Money 7.0 worth the $54.45 upgrade fee, and the new interface makes the program *the* finance manager for people who really want to track and manage their money—not just spend it.

CHRIS SHIPLEY

Where can you turn for HELP?

In this issue, in every issue, *PC/Computing* solves your computing problems, answers your questions, and supplies you with hot tips.

PC Computing

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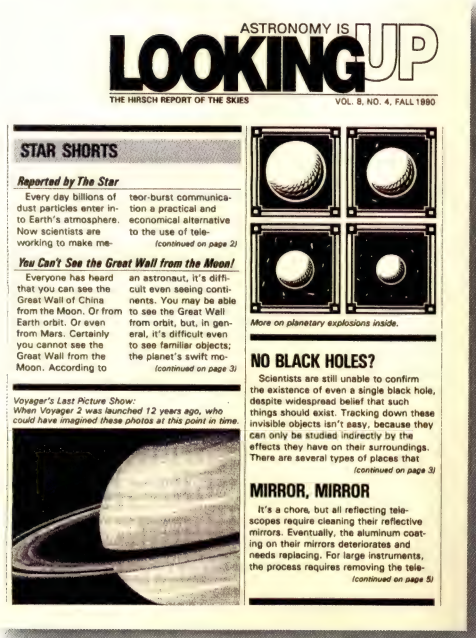
To update, send $75 (add $4.90 shipping/handling) and your original Publisher's Paintbrush program disk to: ZSoft Update, Dept. RG, P.O. Box 8123, San Francisco, CA 94128. Specify 3.5" or 5.25" disk. CA (6.25%) and GA (3%) residents add sales tax. Canadian customers add $15.90 for air shipping. Outside N. America, add $15.90 for surface shipping, $24.90 via air. Payment in U.S. funds by check, money order, VISA, MC or AX. Upgrades from all ZSoft PAINT programs available; call for details.

If you think the HP LaserJet III is great,


ASTRONOMY IS LOOKING UP

THE HIRSCH REPORT OF THE SKIES VOL. 8, NO. 4, FALL 1990

STAR SHORTS

Reported by The Star

Every day billions of dust particles enter into Earth's atmosphere. Now scientists are working to make meteor-burst communication a practical and economical alternative to the use of tele- (continued on page 2)

You Can't See the Great Wall from the Moon!

Everyone has heard that you can see the Great Wall of China from the Moon. Or from Earth orbit. Or even from Mars. Certainly you cannot see the Great Wall from the Moon. According to an astronaut, it's difficult even seeing continents. You may be able to see the Great Wall from orbit, but, in general, it's difficult even to see familiar objects; the planet's swift mo- (continued on page 3)

Voyager's Last Picture Show: When Voyager 2 was launched 12 years ago, who could have imagined these photos at this point in time.

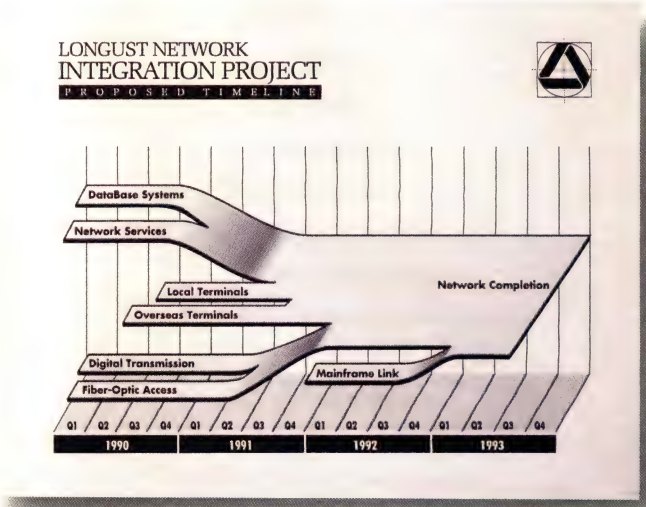
More on planetary explosions inside.

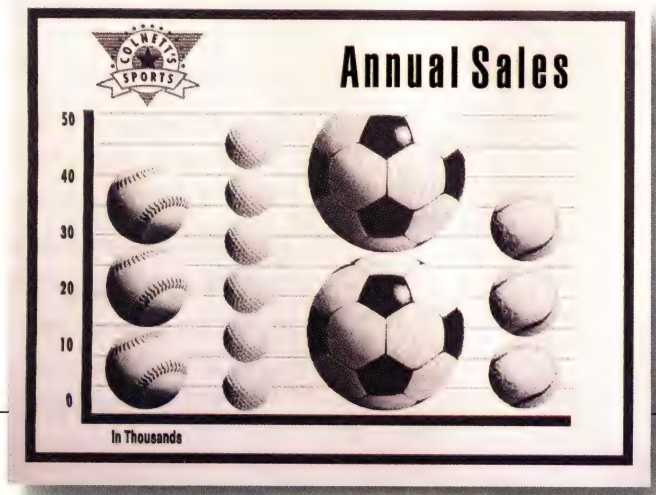
NO BLACK HOLES?

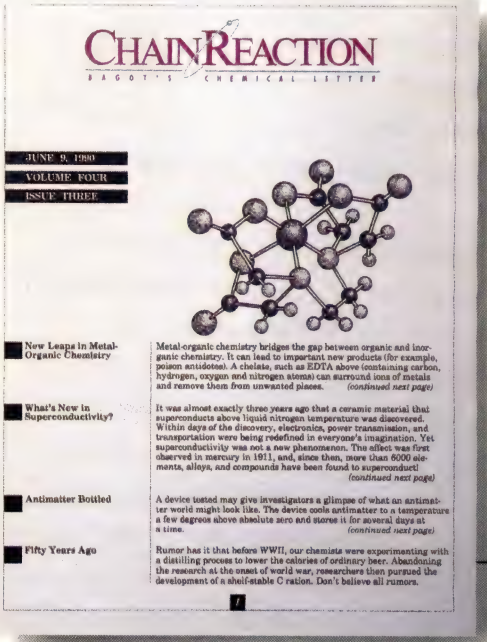
Scientists are still unable to confirm the existence of even a single black hole, despite widespread belief that such things should exist. Tracking down these invisible objects isn't easy, because they can only be studied indirectly by the effects they have on their surroundings. There are several types of places that (continued on page 3)

MIRROR, MIRROR

It's a chore, but all reflecting telescopes require cleaning their reflective mirrors. Eventually, the aluminum coating on their mirrors deteriorates and needs replacing. For large instruments, the process requires removing the tele- (continued on page 5)






CHAIN REACTION

BAGOT'S CHEMICAL LETTER

JUNE 9, 1990
VOLUME FOUR
ISSUE THREE

New Leaps in Metal-Organic Chemistry

Metal-organic chemistry bridges the gap between organic and inorganic chemistry. It can lead to important new products (for example, poison antidotes). A chelate, such as EDTA above (containing carbon, hydrogen, oxygen and nitrogen atoms) can surround ions of metals and remove them from unwanted places. (continued next page)

What's New in Superconductivity?

It was almost exactly three years ago that a ceramic material that superconducts above liquid nitrogen temperature was discovered. Within days of the discovery, electronics, power transmission, and transportation were being redefined in everyone's imagination. Yet superconductivity was not a new phenomenon. The effect was first observed in mercury in 1911, and, since then, more than 6000 elements, alloys, and compounds have been found to superconduct! (continued next page)

Antimatter Bottled

A device tested may give investigators a glimpse of what an antimatter world might look like. The device cools antimatter to a temperature a few degrees above absolute zero and stores it for several days at a time. (continued next page)

Fifty Years Ago

Rumor has it that before WWII, our chemists were experimenting with a distilling process to lower the calories of ordinary beer. Abandoning the research at the onset of world war, researchers then pursued the development of a shelf-stable C ration. Don't believe all rumors.

7

Introducing the new HP LaserJet IIID printer. The LaserJet that combines all of the advanced capabilities of the exciting LaserJet III with all of the paper-handling features required by today's busy office.

There's a lot to like. Like two paper trays for different types and sizes of paper. 200-sheet capacity in each of those trays for less reloading. And two-sided printing that lets you easily condense your output. Even an optional automatic envelope feeder that eliminates manual feeding.

Equally impressive is HP's Resolution Enhancement technology. Pioneered in the LaserJet III, this technology actually varies the sizes of dots. So curves really curve. Lines are never jagged. And you get resolution never before seen in a 300 dpi printer. Output has never looked so good.

Documents can be made even more elaborate thanks to our en-

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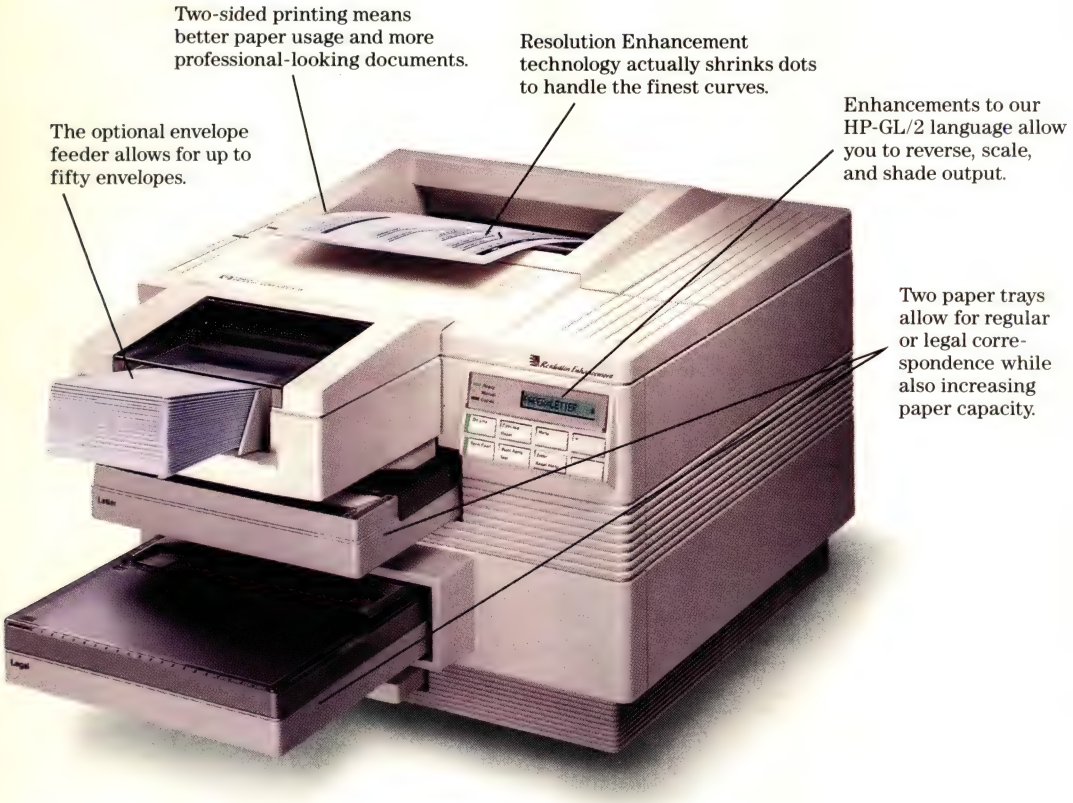
you'll automatically like the new HP LaserJet IIID.



hanced PCL5 printer language, which includes HP-GL/2 graphics language. You can print regular or reverse type. Shaded text. Even portrait and landscape on the same page.

Beyond this, all types of options are available for all types of users. Which means you can customize with Adobe® PostScript® software. Add memory. Or better express yourself with our MasterType library of fonts and typefaces. You can even connect a Macintosh.

The best part is that the $2,395* LaserJet III and $3,595* LaserJet IIID are both easily within any budget. So call **1-800-752-0900, Ext. 1586.** We'll tell you where to find your nearest authorized HP dealer.

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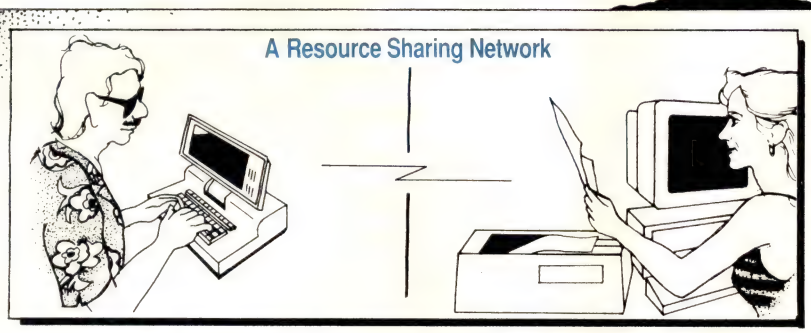

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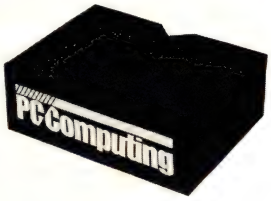

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PC Computing

COMING SOON

Great PC Ideas
Need some inspiration for New Year's resolutions? We'll provide you with dozens of projects, tips and new ways of using your PC for optimal productivity. Plus, we'll predict the companies, people, hardware prices and business opportunities to watch in 1991.

1-2-3 Add-Ins
No matter how many times Lotus enhances its spreadsheet, 1-2-3 will never be all things to all users. Fortunately, third-party add-ins make up for its limitations. We review 25 of these products in categories like display and print enhancers, file protectors and database add-ins, plus explain how to use 1-2-3's add-in manager.

Windows 3.0 Utilities
New Windows-based utilities let you perform system housekeeping and maintenance chores without ever leaving the Windows environment. We look at the best Windows file and disk managers, program launchers, graphics file converters as well as mini-applications.

Plus... Find out what to do if your PC's monitor is killing you, learn how to share printers inexpensively, use different ways to end a Windows session and analyze the effect of an IRA on your retirement savings.

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PC Magazine, Best of 1989 Awards
January 16, 1990 issue

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PC Magazine

"...CheckFree did not fail me. When my banking statement arrived the first thing to catch my eye was a CheckFree check...this laser-printed paper check was reassurance that someone else could be trusted to pay my bills..."

Robert Cullen, Home Office Computing

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BEFORE

FaceLift

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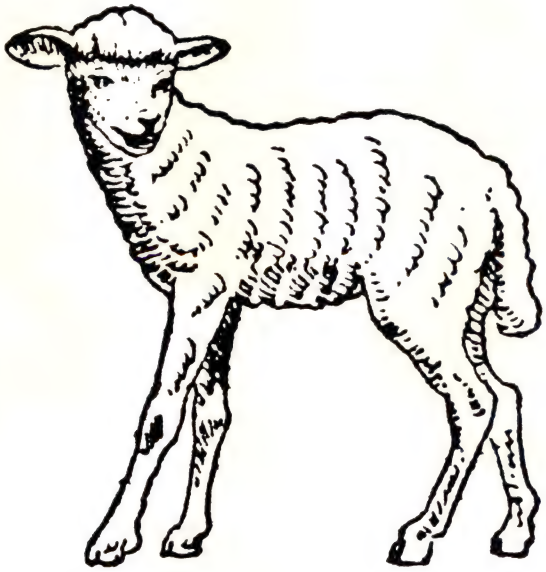

AFTER

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EDITORIAL PRODUCT INDEX

NAME/COMPANY	READER SERVICE	PAGE NUMBER
COLOR PRINTING SOFTWARE		
Corel Draw — Corel Systems Inc.	400	114,168
Designer 3.0 — Micrografx	401	114
Publisher's Prism — InSight Systems	402	114
COMMUNICATIONS PACKAGES		
Crosstalk Mk. 4, Ver. 2.0 — Digital Communications Associates Inc.	403	135
Sprint — Borland International	404	168
COMPUTERS		
CompuAdd 425 — CompuAdd	405	45
Deskpro 486/Model 650 — Compaq Computer Corp.	406	135
GRiDcase 1550sx — GRiD Systems Corp.	407	45,135
PS/1 — IBM	408	266
TrávelMate 3000 — Texas Instruments Inc.	409	86
DATABASES		
dBASE IV — Ashton-Tate	410	168
Q&A — Symantec	411	168
FoxPro — Fox Software	412	168
Quattro Pro — Borland International	413	168
DATA/MEMORY MANAGERS		
Desqview 2.3/QEMM 5.1 — Quarterdeck Office Systems	414	45
Magellan — Lotus Development Corp.	415	168
DESKTOP PUBLISHING SOFTWARE		
Adobe Illustrator — Adobe	416	114,168
PageMaker — Aldus Corp.	418	114
Ventura Publisher — Ventura Software Inc.	417	114,168
FAX BOARDS & ACCESSORIES		
Everfax 24/96 — Everex Systems Inc.	419	272
EZ-Fax96 — Calculus Inc.	420	272
Faxit for Windows — Alien Computing	421	272
FaxMail 96 — Brooktrout Technology Inc.	422	272
FaxPro — The Fax Group	423	272
Fax96 — Fremont Communications Co.	424	272
GammaFax NA — GammaLink	425	272
HiJaak PS — Inset Systems	426	272
MaxFax — Macronix Inc.	427	272
PerfectFax — Adtech Micro Systems Inc.	428	272
Prometheus Maxfax — Prometheus Products Inc.	429	272
SatisFaxtion — Intel Corp.	430	86,272
SkyFax 2.0 — Efco Systems Inc.	431	272
Zoltrix ZX1896 — Zoltrix Inc.	432	272
FINANCE-MANAGEMENT SOFTWARE		
Andrew Tobias' Managing Your Money Version 7.0 — Meca Ventures Inc.	433	304
Quicken 4.0 — Intuit Inc.	434	135
FONT MANAGERS		
ATM for Windows — Adobe Systems	435	86
SuperPrint 1.1 — Zenographics	436	45
GAMES & LEISURE		
Car Builder — Optimum Resource Inc.	437	284
Faces...Tris III & Flight of the Intruder — Spectrum HoloByte	438	284
LHX Attack Chopper — Electronic Arts	439	284
Mickey's ABC's, etc. — Walt Disney Computer Software Inc.	440	284
M1 Tank Platoon — MicroProse Software Inc.	441	284
Mixed-Up Mother Goose & King's Quest V — Sierra On-Line	442	284
Nemesis Go — Toyogo Inc.	443	284
Nuclear War — New World Computing	444	284
Red Baron & Heart of China & Rise of the Dragon — Dynamix	445	284
Secret of Monkey Island & Secret Weapons/Luftwaffe — Lucasfilm Games	446	284
Star Control — Accolade	447	284
Thorpe's Real Blackjack & Slim's Real Poker — Villa Crespo Software	448	284
Where/Carmen Sandiego? & Dark Heart of Uukrul — Broderbund Software	449	284
INFORMATION SERVICES		
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Business VEISA — Advanced Logic Research	457	86
Cyclops & 512 Versa Color II LCD — Proxima by Computer Accessories Inc.	458	135
DRM-600 CD-Rom changer & LD-V8000 videodisc player — Pioneer Comm. of America Inc.	459	135
DVA-4000 video adapter — VideoLogic Inc.	460	135
GeoWorks Ensemble — GeoWorks	461	45,86
GRiDPad — GRiD Systems Corp.	462	86
Hardcard II XL 105 — Plus Development Corp.	463	135
LAN-1001 TV tuner — ISS Engineering Inc.	464	135
LAPC-1 Sound Card & Notes — Lotus Development Corp.	465	86
MA-12C speakers — Roland Corp.	466	135
OmniKey/Ultra — Northgate Computer Systems Inc.	467	86
Ultra 96 — Hayes Microcomputer Products Inc.	468	86
Windows Wallpaper — Wilson WindoWare	469	135
PRINTERS		
BJ-10e Bubble Jet — Canon USA Inc.	470	86,135
Epson LQ-860 — Epson America	471	114
LaserJet III & PaintJet XL Ink Jet — Hewlett-Packard	472	86,114
QMS ColorScript 100 & PS 410 — QMS Inc.	473	86,114
Silentwriter2 Model 90 — NEC Technologies	474	45
SCANNERS		
ScanMan Model 256 — Logitech	475	45,86
The Typist — Caere Corp.	476	86
SPREADSHEETS		
Excel — Microsoft Corp.	477	304
Lotus 1-2-3 — Lotus Development Corp.	478	168
Quattro Pro — Borland International	479	304
UTILITIES		
Batchworks — Publishing Technologies Inc.	480	145
Bridge Tool Kit — Softbridge Inc.	481	145
FirstApps for Windows — hDC Computer Corp.	482	135
Norton Utilities 5.0 — Symantec Corp.	483	135
PC Tools — Central Point Software	484	212
PerForm Pro — Delrina Technology	485	45
Wingz for Windows — Informix Software	486	86
VIDEO CARDS		
Targa Plus — Truevision	487	86
VGABasic-16 — ATI Technologies	488	45
WORD PROCESSORS		
Amí Professional — Amí Software	489	168
Legacy — NBI	490	45
Microsoft Word — Microsoft Corp.	491	168
WordPerfect — WordPerfect Corp.	492	168

ADVERTISER INDEX

ADVERTISER	READER SERVICE	PAGE NUMBER
Abacus Software	182	215
Abra Cadabra	112	34
Accolade	105	282-283
Advanced Logic Research	143	C5-C7
Apple	*	21-23
Appoint/IMCS	203	182
Arlington	161	238
Artisoft	123	213
Atari Corp	174	298
Baudville	186	15
Bell Atlantic	206	315
Bitstream	155	314
Bloc Publishing	228	37
	117	79
Blue Ridge Creative Software	113	301
Bourbaki	191	214
Buffalo Products	171	300
Calera Recognition	160	318
Canon	213	204-205
CheckFree	*	313
Chronologic Corp	236	275
Compaq	*	176-177
Compuserv	128	199
Computer Direct	115	251
Corel	212	111
Cougar Mountain	176	295
Curtis	*	C8
DAC Easy Inc	184	77
Damark	*	245
Datamax Research	234	305
Datastorm	227	180
Dell Computer	210	70-71
	177	72-75
	180	C2-1
Digital Vision	140	292
Direct Link	156	248
Disk Technologies	253	206
Dolch Computer Systems	104	39
Dustin Discount Software	147	2-3
EFC Inc	142	312
EKD	107	246
Epson	*	192-193
Ergo	132	179
Everex Systems	130	307
	188	152-153
Exceptional Bus Solutions	250	299
Executive Photo Supply	225	246
Fast Micro	165	236-237
Fellowes	220	198
Fifth Generation	152	81
	175	83
	145	270-271
Forminco Inc	169	240
Funk	195	44
Future Trends Software	229	186
Gateway 2000	*	123-130
GE Rents	208	69
Generic Software	137	296
GEnie	109	118
Gibson Research	187	306
Golden Bow Systems	*	29
Gold Hill Software	173	241
Group 1 Software	158	36
Hahn's Enterprise	102	242
Hard Drives International	*	239
Hard Drives Int'l Memory	*	247
Haventree Software	214	178
Hayes	219	24
Hewlett-Packard	*	278-279
	*	166-167
	*	310-311
IME	209	244
In Focus	185	287
Intel Corp	*	65
	*	67
Intel PCEO	159	188-189
Intuit	240	319
Iverson Computer Corp	178	112-113
LA Trade	*	249
Liberty Systems	114	244
Logitech	245	26
	193	134
Lotus Development	*	291
	*	131-132
Maxell Corp	*	41
Meca Software	201	169
	153	277
Micrografx	*	197
Micro Logic	*	63
Microlytics	254	297
Microrim	116	181
Microsoft	*	297
	*	299
	*	301
Microtac	246	34
NEC	118	30-31
Northgate	*	170-171
	*	219-230
	*	302-303
Pacific Data	*	293
Pacioli/M-USA	146	281
Parsons	247	35
Patton & Patton Software	224	38
Peachtree Software	256	183
Peoples College	197	246
Peter Norton	167	117
	198	269
Plus Development	168	59-61
Power Up	233	18
QMS/Laser Connection	215	144
Quarterdeck Office Systems	163	131
Reasonable Solutions	119	250
Reference Software	241	32
Remote Control Int'l	244	203
Samna Corp	223	288
Seiko Instruments	108	267
Sharp Computers	243	211
Ski Soft	149	214
The Software Labs	139	243
Software Products Int'l	216	274
Software Publishing	179	173
	230	285
SPSS	200	195
Stairway Software	199	40
Standard Computer	248	84-85
Star Micronics	255	184-185
STSC	218	175
Symantec	162	47
	190	16
Tandon Computers	181	159-163
	238	200-201
Tandy Corporation	226	187
Timeworks	106	217
Toshiba America	222	142-143
Touchstone Software	104	110
	217	110
Underware Electronics	157	234-235
Volks Writer	249	174
Ward Systems Group Inc	251	28
WordPerfect Corp	*	42-43
Zeos	141	7
	151	8-9
	154	10-11
	111	12-13
	166	14
	*	49-56
	125	57
	*	207-208
	177	209
Z Soft	120	309

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PC/Computing (ISSN 0899-1847) is published monthly by Ziff-Davis Publishing Company, a division of Ziff Communications Company, One Park Avenue, New York, NY 10016. Second Class postage paid at New York, NY 10016 and at additional mailing offices. Postmaster: Send address changes to PC/Computing, P.O. Box 58229, Boulder, CO 80321-8229.

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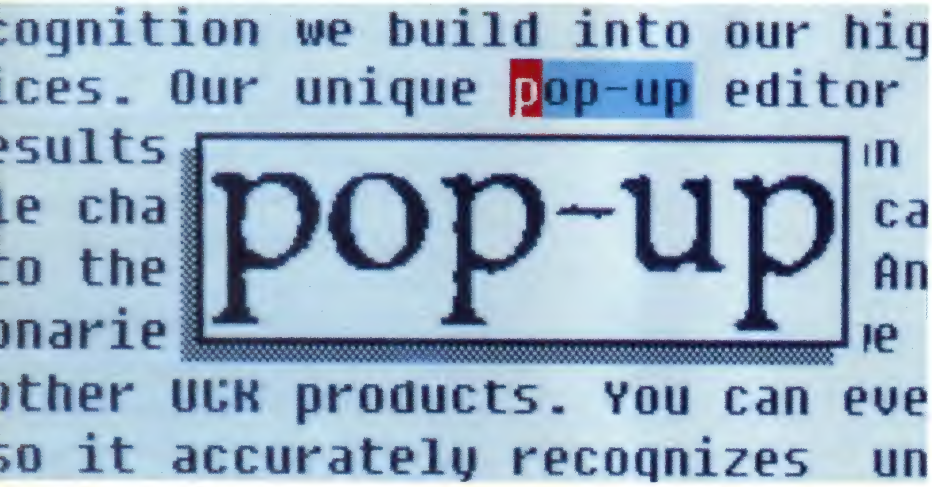

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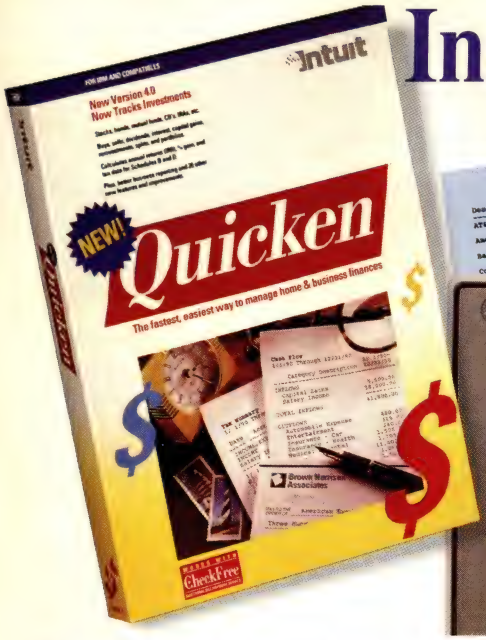

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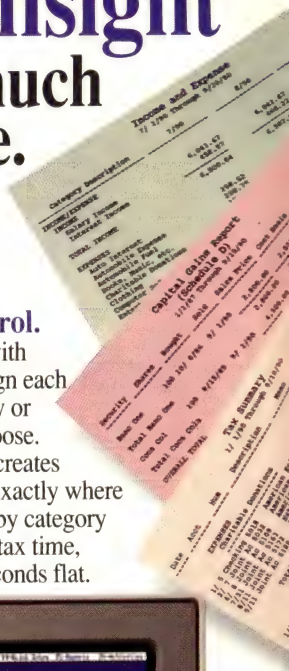

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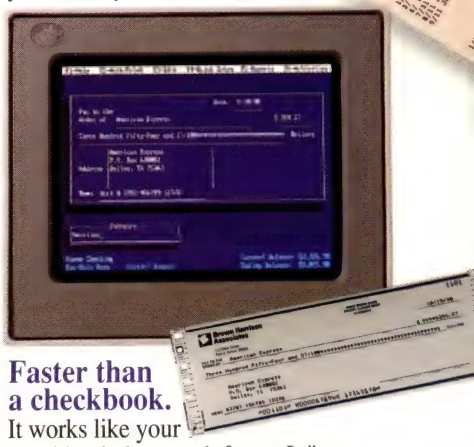

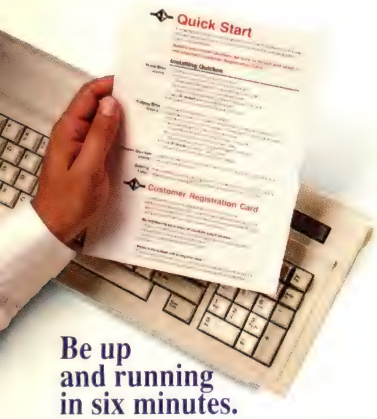

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PM12

A Thinking Machine: Soul of Comedy

You, too, can write a program as irritating and empty-headed as a real person. By Penn Jillette

THERE'S SOME AI flaming going on in the Jungle, a little private BBS over which a couple dozen hipsters write to one another every day: scientists, comedy writers, artists, skeptics, magicians, a microbiologist and a deejay. We have an open forum and our guy from Bell Labs (if I said his name, you might recognize it; he's the Elvis Costello or maybe the Kool Moe Dee of computer science. I don't know, I can never keep that straight) has been fighting with the guy from MIT's Media Lab about artificial intelligence.

The rest of us Jungle-beaters watch on and write little heartfelt messages about Uma Thurman versus Christina Applegate. You know the basic arguments (I'm talking now about AI, but you probably also know the basic arguments about Uma and Christina). It comes down to one question: Can machines think?

This question is related to the Turing test, and since the Cambridge Center for Behavioral Studies is offering cold cash for machines that can pass it, I guess we'll all pay a little more attention. To pass the test, a computer and a person in a room must be indistinguishable to a person outside the room. If a computer could pass for a human, it would be simulating thinking, but is that the same as real thinking? Would it be self-aware? Could it make a spontaneous joke?

The guys on the Jungle go on and on. I don't know. I think I lean toward Uma.

Trying to get a machine to pass for a sane, creative person is really tough. We all have friends who wouldn't pass for human. Put Ozzy Osbourne in that room and let Marvin Minsky type to him. Marv could type till he was blue in the knuckles, and I doubt he'd perceive any semblance of thought.

My nightmare is that the first "thinking" computer contestant would be a dead ringer for Alan Alda. But I've met the programmers at the vanguard of this science. The more likely first test will conclude with the examiner saying: "I give up. Is Charlie Manson really in that tiny room?"

Maybe the day of computer-man isn't that far away. Here's an idea for a program you could write that's irritating and empty-headed, just like a real person. But I'm guessing you won't get dime one from the committee.

Write a program that flashes "I CAN GUESS YOUR AGE!" across the screen. Give it groovy graphics and colors. When a person touches any key, the screen should say, "Want me to guess your age?" And when you type Y, it says, "Are you 1 year old?" And when you type N, it says, "Are you 2 years old?" Type N again, and it says "Are you 3 years old?" And when you get the joke, smile just a little and then hit Esc, it says "I CAN GUESS YOUR WEIGHT." And even if you don't hit a key, it persists, "Do you weigh 1 pound?" Then "Do you weigh 2 pounds?" No matter what key you hit—or even if you don't hit a key—it says "OK, enough fun. Give someone else a try."

This is the idea of a friend of the guy at Bell Labs. The way the story goes, he wrote this program so he could type it quickly into demo Commodores.

Now I don't know what makes us human or what constitutes thought, and I've got no money riding on the Turing scam. But I think that this program, running in a K mart somewhere, pretty much captures the soul of pure comedy. And if not comedy, it's at least Howie Mandell.

ILLUSTRATION BY CATY BARTHOLOMEW

Penn Jillette, the taller half of Penn & Teller, is appearing in theaters everywhere with The Refrigerator Tour.

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